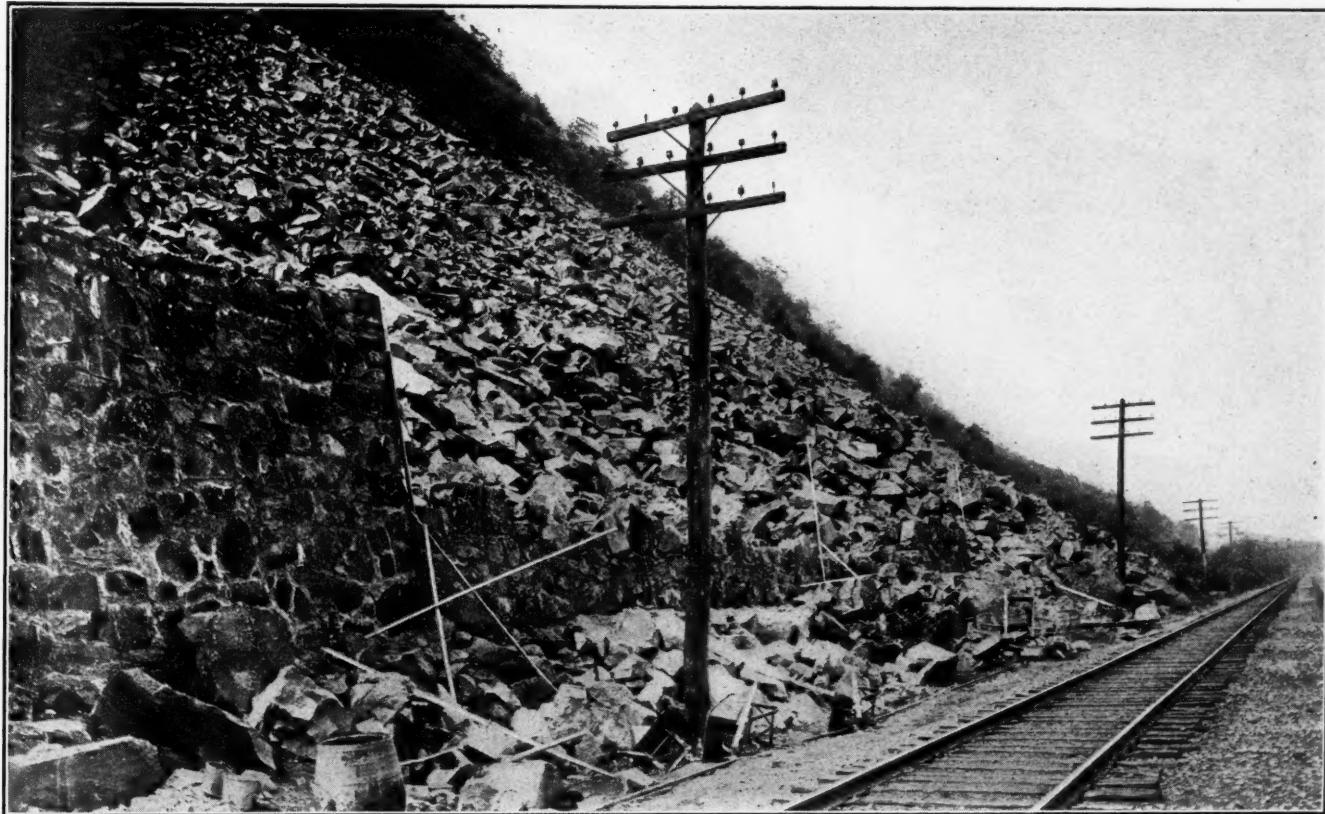


Municipal Journal

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DIFFICULT CONDITIONS FOR CONSTRUCTING ROAD; AT FOOT OF STEEP TALUS.

THE LONG CLOVE-HAVERSTRAW STATE HIGHWAY

Construction on Slope of Steep Talus, the Only Site Available, Unusually Difficult.—Building Retaining Walls on Steep Slopes.—Back-Filled With Hand Laid Stone.—Asphalt Macadam Surface.

This road is a continuation of the Congers-Long Clove Road, and is a part of New York State Route No. 3, which, when ultimately completed, will be the main road running to Albany through Newburg and Kingston, along the river front on the west side of the Hudson River. This road is particularly interesting on account of its peculiar location and its many construction difficulties. The old road which runs from the Long Clove to Haverstraw has a very bad alignment and very many sharp curves and steep grades. Comparative estimates showed that, keeping the original alignment, the elimination of curves and grades would result in more extensive earth and rock work than would a new alignment carried over a suitable site. Preliminary lines were run on the mountain side and finally a line was accepted along the West Shore R. R. which takes in an old switchback on the mountain side and continues almost parallel with the

railroad tracks for about a mile. The line was located by E. H. Stewart, First Asst. Engineer.

The lines originally laid out had a maximum grade of 6 per cent; but when the contract was let and construction almost begun, it was found that the Railroad Company would not give easement on its right of way between Stations 120 and 136 and Stations 145 and 156. The line, therefore, had to be moved into the mountain to clear the right of way line, which was 75 ft. and 35 ft., respectively, from the center line of tracks. Between Stations 120 and 136, the hillside rises very rapidly, and at 75 ft. distance is about 80 ft. above the railroad track. This necessitated the construction of a retaining wall 600 feet long, considerable rock blasting and increasing the maximum grade to 8 per cent. Between Stations 145 and 156 along a talus side hill a retaining wall 1,100 feet long had to be constructed.

The road begins at Station 85, which is the end of the Congers-Long Clove Road, with a long somewhat sharp curve, and runs into a deep rock cut at Station 97. Just before the rock cut, the new road is about 20 feet above the old road, which it crosses, almost at right angles. Here was built a 3-span reinforced concrete overhead crossing of pier and abutment type with flat slabs, the middle span being 18 ft. and two side spans 12 ft. each. Leaving the deep rock cut from Station 100 to Station



BRIDGE ON LINE OF LONG CLOVE-HAVERSTRAW ROAD.

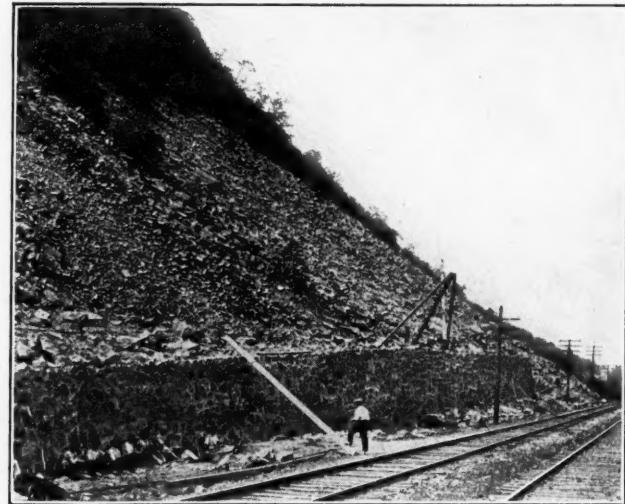
120, the road runs on a side hill on a 2 per cent. grade with a good alignment, and here is one of the most picturesque parts of the road. It gives a beautiful view of the Hudson, which lies about 300 feet below, and perhaps no roadway in New York state equals it in scenery and picturesqueness.

Between Stations 129 and 136, there is a heavy rock cut on the hill side of the road and a retaining wall from 6 to 20 feet high on the outer side. Considerable difficulty was experienced in finding a suitable foundation for the wall, due to the fixed location of the toe line on the steep side hill slope. The grade of the bottom of the trench, which was excavated down from the face of the slope, varies so rapidly that the wall had to be built in independent sections from 50 to 75 feet long, to take care of the unequal pressures and settlements. The nature of the foundation was such that stepping was resorted to, the steps varying in height from 3 to 6 feet, and the foundation being made wider than originally intended, invariably butting against the rock ledge. Adjoining sections were in every case divided with a tar paper joint, running from bottom to top of wall, in order to allow the separate sections to settle independently. No settlement was observed, except on the last 75-foot

section. There, before the backfill was made, a very heavy rainfall occurred and washed under the foundation, causing a settlement of about $\frac{3}{4}$ of an inch, the vertical joint opening about $\frac{1}{8}$ of an inch. Observations were taken on the wall after the settlement for a period of two months, but no further settlement occurred. The backfill was of rock carefully laid so that no further trouble is expected.

The foundation was protected on the front or downhill side by rip-rap, because an earth backfill would not hold on account of the steepness of the slope. A trench was excavated about five feet from the face of the foundation of the wall, and a two foot dry wall, which served as a footing for the rip-rap, put up. The upper rock cut gave some difficulty on account of the proximity of the R. R. tracks, where considerable traffic passes all day long. Blasting had to be done very cautiously. The rock stratum is a good trap rock with many seams. No drilling was necessary at all, the cut was taken out from the two end faces of the cut, working like two headings toward each other, the rock being mostly barred out, mud-capped or a hole made in the seam and blasted out. This work progressed very slowly; still the contractor was quite fortunate, having no accidents and breaking only three rails and delaying only a single train for one hour during entire progress of work lasting four months.

From Stations 136 to 145 there is a 50-foot fill. At Station 141, the intersection with the Short Clove Road, a



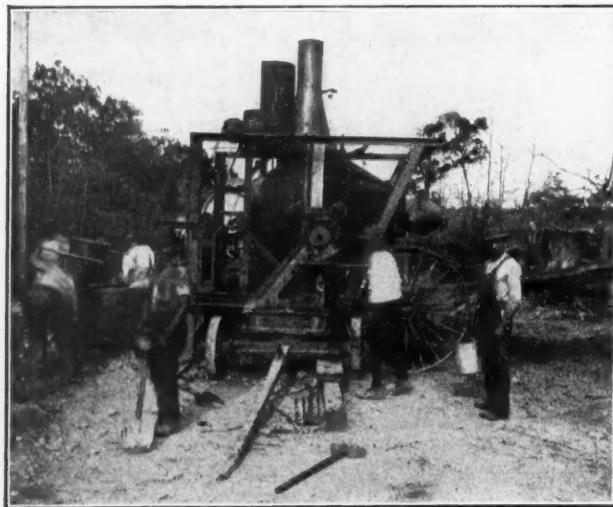
RETAINING WALL FOR ROAD.

retaining wall had to be built on the hill side of the road, and the old road relocated for a length of 200 feet.

From Station 145 to Station 156 there is a talus slope on the side hill formed by the disintegration of a rocky mountain cliff. The slope is made up of pieces of rock varying from 6 cu. ft. to 12 cu. yds., the cavities in which are of considerable size. It was thought originally almost an impossibility to build the road on such a treacherous side-hill, and especially to make a foundation for an eleven hundred foot retaining wall.

Of the different schemes proposed to build the road over this slope, that of S. J. Stewart, division engineer, was finally accepted. This was to leave the natural slope intact and to build the road sloping toward the inner side, with a retaining wall on the railroad right-of-way line.

The foundation of the above retaining wall was built by excavating short sections 30 feet to 50 feet long, removing all dirt and small stones, and exposing all cavities. After thoroughly cleaning the exposed faces of the rock trench with a water hose, the trench and cavities were filled with a 1-3-6 mixture of concrete. At times these cavities were of considerable depth and the openings for



SMITH HOT MIXER, MIXING GRAVEL AND ASPHALT.



OPENING ROAD IN WOODED COUNTRY.

the admission of concrete small. In many cases, the bottom opening of a large cavity was plugged up with cement bags, or a large stone, and the concrete well rammed into these cavities and around the adjacent rocks. The width of foundation ranged from 6 to 12 feet, according as conditions permitted. In those places where the height of wall demanded wider foundations, and the removing of the rocks from the talus slope to that width would have destroyed the repose of the slope, the cavities in the slope were filled with concrete to such a height as would give the required foundation width. When danger to the slope or the size of the boulders made it impracticable to remove them from the limits of the foundation in order to get the sufficient depth, concrete was placed under and around the boulders, being held in place by putting a dry wall up as a form. On this concrete foundation, a masonry wall was built of a 45 per cent. section, the top being 2 feet wide. An 18-inch thick guard wall, with a rustic coping, was built on top of the wall to a height of $3\frac{1}{2}$ feet, giving a finished appearance in accord with the natural surroundings. All the backfilling was of rock, carefully placed. To take care of drainage,

4x10-inch weep holes were placed from ten to fifteen feet apart. There has been no settlement whatsoever observed in the various parts of this wall. Between Stations 150 and 152, the slope was steeper than on other parts of the road, and it was thought advisable to put a piece of breast wall on the hill side of the road, to hold the slope of the talus above the road.

From Station 156 to Station 199 (the end of the road), on the new location, no serious difficulty was encountered.

The paving of the road is of the asphaltic macadam type, penetration method, using 3 inches of bottom stone and 3 inches of top stone, with two applications of asphaltic binder, New York State Highway Department standard bituminous material "A" residuum. In the first application, $1\frac{1}{4}$ gallons, and in the second, 1-3 of a gallon were used. The stone used for the courses was local trap rock taken from the talus side hill without quarry-



FINISHED ROAD IN WOODED COUNTRY.

ing. The section of the road is 16 feet of macadam with four-foot shoulders on each side and one-foot ditches. All ditches on a five per cent grade or over are paved with cobble stones. The total length of the road is 2.16,



ROAD CONSTRUCTED IN TALUS, ALMOST COMPLETED

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NEW YORK STATE FORM FOR RECORDING PROGRESS IN CONSTRUCTION OF INDIVIDUAL ROADS.

miles. The culverts were constructed of 1-3-6 concrete for bottom and side walls, and 1:2½:5 concrete for the slabs, which were reinforced with rib metal reinforcement, according to the standards of the Department.

The total cost of this road was \$60,317.06. The average amounts and costs per mile were: Earth, 7,124 cu. yds., \$3,063. Rock, 5,856 cu. yds., \$7,028. Sub-base, 83 cu. yds., \$145. Concrete and masonry, 2,006 cu. yds., \$10,079. Macadam, bottom course, 782 cu. yds. \$2,191; top course, 782 cu. yds., \$4,210. All other items, \$1,209. The cost of the 33,500 gallons of bituminous material used in the above was \$3,685. The contractor was the Bridgeport Construction Company, of Poughkeepsie.

The division engineer was Spencer J. Stewart; Eugene Geduldiger was engineer in charge, to whom we are indebted for the above description. To Clarence Greuner, who had charge of the work for the contractor, the engineers give much of the credit for the successful performance of the work.

COMPETITIVE ESSAY ON EARTH ROADS.

A gold medal is to be awarded by Logan Waller Page, Director of the Office of Public Roads of the U. S. Department of Agriculture for the best essay or composition on the subject of the repair and maintenance of earth roads which is submitted by a boy or girl between the ages of 10 and 15 who attends a country school. These must be sent to Mr. Page before May 15th. The information embodied therein may be obtained from books or any other source, but no quotations should be used. But one side of the paper must be written on, each page numbered, and the name, age and address of

the writer, and the name and location of the school attended must be plainly written on the top of the first page. The object of this competition is, we believe, not to obtain information or material of any kind which would be of use to the department, but to stimulate in the younger children of the rural districts an interest in the subject of improving the roads over which they are compelled to travel to and from school; an interest which a few years from now will, it is hoped, be brought to bear on the general movement for the improvement of country roads.

SHORT SPAN BRIDGES.

The Office of Public Roads of the Department of Agriculture has just issued a bulletin entitled "Data for Use in Designing Culverts and Short Span Bridges," which was written by Charles H. Moorefield, highway engineer of the office of Public Roads. This pamphlet of thirty-eight pages discusses briefly the size of water way required, using Professor Talbot's formula; the use of vitrified clay pipe, cast iron pipe and corrugated iron pipe for culverts; also the construction of stone block culverts, reinforced concrete in the form of slab top box culverts, T beam and I beam superstructures, and also details for railings, and wing walls and abutment walls. These descriptions and instructions are followed by a set of specifications for reinforced concrete bridge and culvert construction, in which provision is made for three classes of concrete, in mixtures of 1-2-4, 1-2½-5 and 1-3-6.

An effort has been made to describe the construction of structures in which economy, simplicity and the aesthetic features are all considered, but none of which is



CONCRETE ARCH BRIDGE IN THE DISTRICT OF COLUMBIA.

allowed to take precedence over safe and durable construction. Concerning the matter of appearance, the author speaks as follows:

Designers of highway bridge and drainage structures are urged not only to investigate the safety and durability of proposed designs, but to consider their aesthetic

features as well. When bridges and culverts are to be constructed of permanent materials, such as reinforced concrete, the designer should bear constantly in mind the fact that any aesthetic defects which may be present in such structures will become more and more apparent as the community develops. For example, a highway bridge the defects of which are hardly noticeable when the highway on each side is bordered by dilapidated fences and buildings may become a veritable eyesore if these features of the landscape are sufficiently improved. A design may be in excellent taste, however, and yet be almost totally devoid of ornamentation. A few simple panels and copings are usually sufficient to lend an attractive appearance to masonry bridges, provided the planes of the wing walls, parapets, etc., are in proper relation to each other and to the roadway.

The accompanying photograph illustrates how an attractive appearance may be secured for culverts and small bridges at slight additional cost.

ASPHALTIC CONCRETE IN QUEENS BOROUGH

An Average Rate of Construction of a Mile a Day.—Method of Constructing, Using Old Macadam as Foundation. Contractors' Plants and Methods.—Piling Sand and Stone During Winter.

A little over 100 miles of highway were constructed in the Borough of Queens, New York City, last year. The average rate of construction during the season was practically, 10,000 square yards a day, and the cost of the work was \$1,877,820. In the majority of cases the construction consisted of bituminous concrete placed upon an old road as a foundation; practically all of these being old macadam roads which had good foundations, many of them Telford, flat grades and good drainage. While about 75 per cent. of the traffic was automobile, the 25 per cent. of horse-drawn traffic necessitated a surface affording a good foothold. Granite block was used for heavy grades only, bituminous concrete being used for practically all the rest.

In a paper before the American Road Builders' Association, G. Howland Leavitt, superintendent of the Bureau of Highways of Queens, said that in deciding between bituminous macadam and bituminous concrete, while it was realized that the former would be cheaper to construct, experience had shown that, under the traffic which these roads will have to bear, it would be necessary to cover the entire surface every year with a flush coat of bitumen and stone costing from 10 to 15 cents per square yard. If this be added to the first cost, the total cost at the end of five years would be about \$1.25 per square yard for bituminous macadam; whereas it was estimated that the bituminous concrete could be laid with a five year guarantee at a price not exceeding this. As a matter of fact, the average of the low bids received was \$1.11, including the guarantee. The prices varied, chiefly on account of differences in length of haul of materials and the varying requirements as to gutters, etc., the maximum being \$1.44 and the minimum 86 cents.

In preparing the old macadam roads for receiving the bituminous concrete, these were lightly scarified to permit reshaping to the desired crown, after which reshaping it was rolled (additional stone being added where neces-

sary) until it was tight and compacted to a width of one foot wider than the finished pavement. Two-inch planks were then drift-bolted to the foundation along the lines to which the asphalt was to be laid, and the asphalt was then spread and raked. In rolling, the rear roller was run over these planks so as to grip them, and in this way good compression was obtained on the edges. Neat cement was cast over the surface after the preliminary rolling and swept with a broom, and rolling then continued to final compression. The planks were then removed and the macadam along the edges was picked out to receive brick curbings, generally laid in three courses and filled with bituminous filler. In some instances the bricks were omitted, and broken stone was used along the edges, filled with screenings and thoroughly rolled. The latter method seems to prove satisfactory where the travel is not crowded, so as to compel vehicles to run along the edge of the pavement.

This 102 miles was divided into 57 contracts varying in length from 6.2 miles to 0.47 miles.

So far this season work has been started on but one contract, that for paving Corona avenue, connecting the old municipalities of Corona and Flushing. The road has a car track in the center and no doubt will be quite heavily travelled by automobiles, trucks and, perhaps, about 25 per cent. of horse-drawn vehicles. The contract was awarded to the J. F. Hill Company of Chicago, which will use a fine stone and sand mixture with Pioneer asphalt. On account of the heavy traffic expected, concrete will be laid for the base, contrary to the more usual practice of using a macadam base.

The J. F. Hill Company in carrying out the work on Corona avenue, which they started last month, are following an unusual plan, at least so far as laying the concrete base is concerned, which is worth study. This plan seems to be especially adapted to road construction rather than street paving in congested localities. Dur-



CONCRETE MIXER AT CORNER INTERSECTING STREET.
Wagon receiving concrete at left; piled material at right.

ing the winter, the contractor has been purchasing crushed stone and sand and piling it up on vacant lots at intersecting streets. The materials are delivered in scows at docks a mile or more away, and are hauled in the contractor's wagons, the teams being hired. For this purpose and for hauling the asphaltic concrete the contractor has an equipment of 47 Eagle bottom dumping wagons. Even with the aid of hitching teams the materials can not be piled up very high. Therefore, one or two teams with scrapers are kept at work working it up towards a high point in the pile.

The plan of storing the sand and stone involves a suitable method of concrete mixing. Instead of putting the mixers out in the street close to the place where the concrete is being laid, the mixer (a Municipal Engineering Company's $\frac{1}{2}$ cubic yard cube mixer) is set up in the lot where the materials are stored. When this pile is exhausted the mixer is moved to the next storage yard. The mixer has a loading skip. A runway about two feet above the ground at the dumping end, with planks running out to the material piles, makes the loading as easy as possible. From the mixer, the concrete is discharged directly into concrete carts and hauled to the work. On the day on which the accompanying illustrations were taken, the base was being laid in the car track. A light bridge, consisting of two planks fastened together at the proper distance, served as a runway on which the cart, with the help of men at the wheels, is backed over the center of the track and dumped. The spreading feature of this cart is of little value in work of this sort and men shovel the concrete into place. However, as the batches measure only half a cubic yard, this involves little labor. The mixer and the outfit illustrated laid last year about 67,000 square yards of concrete and no breakdowns or troubles of any consequence were experienced. As much as 1,000 square yards per day were laid at times.

As to the value of this method of construction, the superintendent, Mr. Beyers, says that the principal objection is the trouble and delay incident to getting in supplies during the progress of the work. However,

looked at as a general proposition, these facts are apparent: The cost of piling up the stone with horse scrapers, watching the material to prevent theft and, perhaps, rent of vacant lots would ordinarily amount to about 10 cents per cubic yard. By purchasing stone in the winter it would seem as if concessions in the price of materials and possibly in teams and labor ought to be obtained. In fact, it would seem reasonable that the material man would stand all the cost of piling for the sake of making deliveries at his option when other work is closed down. In the actual mixing of the concrete there is presumably a saving in labor because men are not disturbed by the wagons being brought in among them. The mixer can be backed closer to the pile of stone from time to time so that the distance traveled by the wheelers is always short. It would seem as if the labor of at least two men is saved in this way. The problem of getting water to the mixer is simplified and delays incident to changing hose connections eliminated. So far, then, there is a credit to the account of this system of management, to say nothing of the simplification of the work. The next item, however, seems to show a loss, though even this would vary with the skill of the management and local conditions. The item of loss is the hauling of the concrete to the work. In no relative positions of work and mixing plant could less than two carts be used, and as the distance between work and mixing plant increases five or even more carts might be needed. Where a mixer

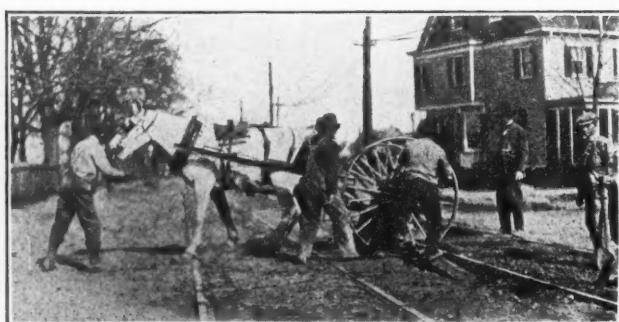


PILED MATERIAL AND APPARATUS IN RENTED LOT.

with a discharge bucket is used there is no charge, except that of operating machinery, between the mixing drum and the work. Without this device, there would be four or more men wheeling, the number varying with the skill of the foreman in keeping his work in good shape. On the whole, comparing the two systems of work the advantage would seem to depend much on the management and the local conditions as to the possibility of securing lots for materials at suitable intervals. In the matter of simplicity of management and guarantee against delays, the advantage is all with the plan adopted by the Hill company.

In last year's work portable plants of several different types were used. The Continental Public Works Company used a semi-portable plant consisting of a high speed engine with locomotive boiler, a sand heating device consisting of an American process dryer, 30 feet long and 4 feet in diameter, jacketed with asbestos and equipped with a Dutch oven with fuel oil burning attachments; and a mixing unit consisting of an enclosed hot sand bucket elevator, sand screens, sand hoppers with the necessary bins for the separation of the mineral aggregate, measuring boxes and a 9-foot asphalt mixer. Asphalt kettles of 1,000 gallons capacity were used. This plant when working 8 hours per day had a maximum capacity of about 1,500 square yards of 2-inch bituminous concrete.

The Barber Asphalt Paving Co. used a permanent plant



DUMPING CONCRETE IN RAILWAY TRACK.



MACADAM ROAD BEFORE IMPROVEMENT.
Rope in Foreground Shows Holes in Surface.

of 3,400 square yards capacity on part of its work, and on another part a semi-portable plant with a capacity of 1,200 square yards of 2-inch bituminous macadam in 8 hours. The latter plant was similar to that of the Continental Public Works Company, but was equipped, like several of the others, with compressed air fixtures by which the asphaltic cement was conveyed from tanks directly to the mixing platform.

The Cleveland Trinidad Company used a permanent plant on the water front with a capacity of about 3,000 square yards of 2-inch bituminous concrete.

J. F. Hill used two Cummer railroad plants, each with a capacity of 2,000 square yards. These are mounted on railroad trucks and are so constructed that they can be dismantled and made to travel on their own wheels. They are provided with horizontal revolving drums mounted over a fire box and surrounded with a fireproof arch through which the mineral aggregate is fed. The melting kettles, mixing apparatus, boilers, engines and shafts are so arranged that they can be readily prepared for

transit or for operation after transit. This company carried a fully equipped laboratory and employed experienced chemists at the plant to supervise tests and analyze its mixtures and pavements.

The Standard Bitulithic Company used six portable asphalt plants of the Warren type, among the principal features of which was that they could be put into operation in a new location in a few hours, and the proportioning of the ingredients is carefully regulated.

Altogether there were 14 plants engaged on the work, but those already described are fairly representative of the others. One plant which was different from the rest was that used by the Newton Paving Company, and is known as the Equitable asphalt plant. In this the mineral aggregate was put directly into the mixing drum and heated by a hot air blower, and then the asphaltic cement was supplied by an air compressor directly from a measuring tank, the stone dust was added and the heating and mixing continued until the proper temperature was reached.



SAME ROAD AFTER RECONSTRUCTION; SHOWS KIND OF IMPROVEMENT.

This plant, which weighed 36 tons, was moved readily, worked very satisfactorily, and had an average capacity of 1,000 square yards of 2-inch bituminous concrete, which amount was, in some instances, exceeded by several hundred yards. The Borough Asphalt Company and



USE OF ROPE FOR ILLUSTRATING UNEVENNESS OF ROADWAY SURFACE IN QUEENS BOROUGH.



ROPE PLACED DIAGONALLY ACROSS ROAD.

the Uvalde Asphalt Company used permanent plants located on Newtown creek. The latter was from 6 to 12 miles distant from the company's contracts, and the material was brought in trolley freight cars to a switch near the work, from which it was hauled by trucks to the street, except in a few instances where there was a trolley track on the street under construction, when the material was shoveled directly from the cars into place.

Not one of the least of the problems in the office of a highway department is a suitable means of demonstrating to the taxpayer that positive practical advantages have been secured in return for the money spent. Photographs of roads before and after improvement are used everywhere for this purpose. The office of Mr. Wineberger, chief engineer of highways for Queens borough, has a fine collection of such photographs. However, photography has its limitations, and these limitations are nowhere more apparent than in the efforts that have been made to produce records of the actual appearance of road surfaces. Photographs are seldom successful in conveying a correct idea of the condition of a road surface to the technical man. In Mr. Wineberger's office a simple method has been developed which certainly aids greatly in recording the contour of a road surface. When a photograph of a road is to be taken a flexible white rope is stretched across the road, loosely so as to follow its unevennesses, and the photograph taken. By reference to the illustrations it will be seen that irregularities which would not otherwise clearly be shown in the photographs (which by the way are professional work on 8 by 10-inch plates) are plainly brought out by the rope.

TESTS OF CONCRETE PAVEMENT.

Some months ago we gave a general description of the proposed system of highways for the state of California, presenting in connection therewith the reason assigned by the engineers for deciding upon a concrete roadway for a considerable portion of these state roads. About 100 miles of state highways have now been contracted for, and a considerable part of this constructed. The concrete employed has a minimum thickness of 4 inches, which may be increased when the engineer considers that the sub-grade demands it. The specifications call for a mixture of 1, $2\frac{1}{2}$ and 5, and State Highway Engineer Austin B. Fletcher states that 1.3 barrels of cement are actually being used per cubic yard of concrete.

A short time ago some crude tests were made of the concrete pavement as actually constructed, with a view

especially to determining its ability to successfully span possible burrows by animals or old trenches which have settled subsequent to the building of the road. The concrete tested had been in place 35 days, but no bituminous wearing surface had yet been applied. The tests are described by Mr. Fletcher as follows:

Before the tests, the supporting earth was removed from under the concrete for a width of two feet and extending in four feet from the edge of the concrete. The tests were made with a so-called ten-ton Kelly-Springfield roller which is so designed that one-third of the load is on each rear wheel. The rear wheels are twenty inches wide.

In the first test the roller was run along the road, its rear wheel crossing the unsupported concrete twelve inches clear of the edge of the pavement.

The second test was like the first, except that the wheel was but six inches clear of the edge of the pavement.

In the third test the roller was stopped and started with the rear wheel on the unsupported concrete, six inches from the edge of the pavement.

There was no noticeable effect on the concrete in any of the first three tests.

In the fourth test the wheel was passed over the unsupported concrete with its side even with the edge of the pavement, and in the fifth it was made to pass over a block of wood, 2 inches by 4 inches by 8 inches, laid flat, twelve inches from the edge of the pavement and lengthwise with the road. A slight deflection was noticeable in both the fourth and fifth tests as the roller passed over the opening, but the concrete regained its original position immediately after the passing of the roller.

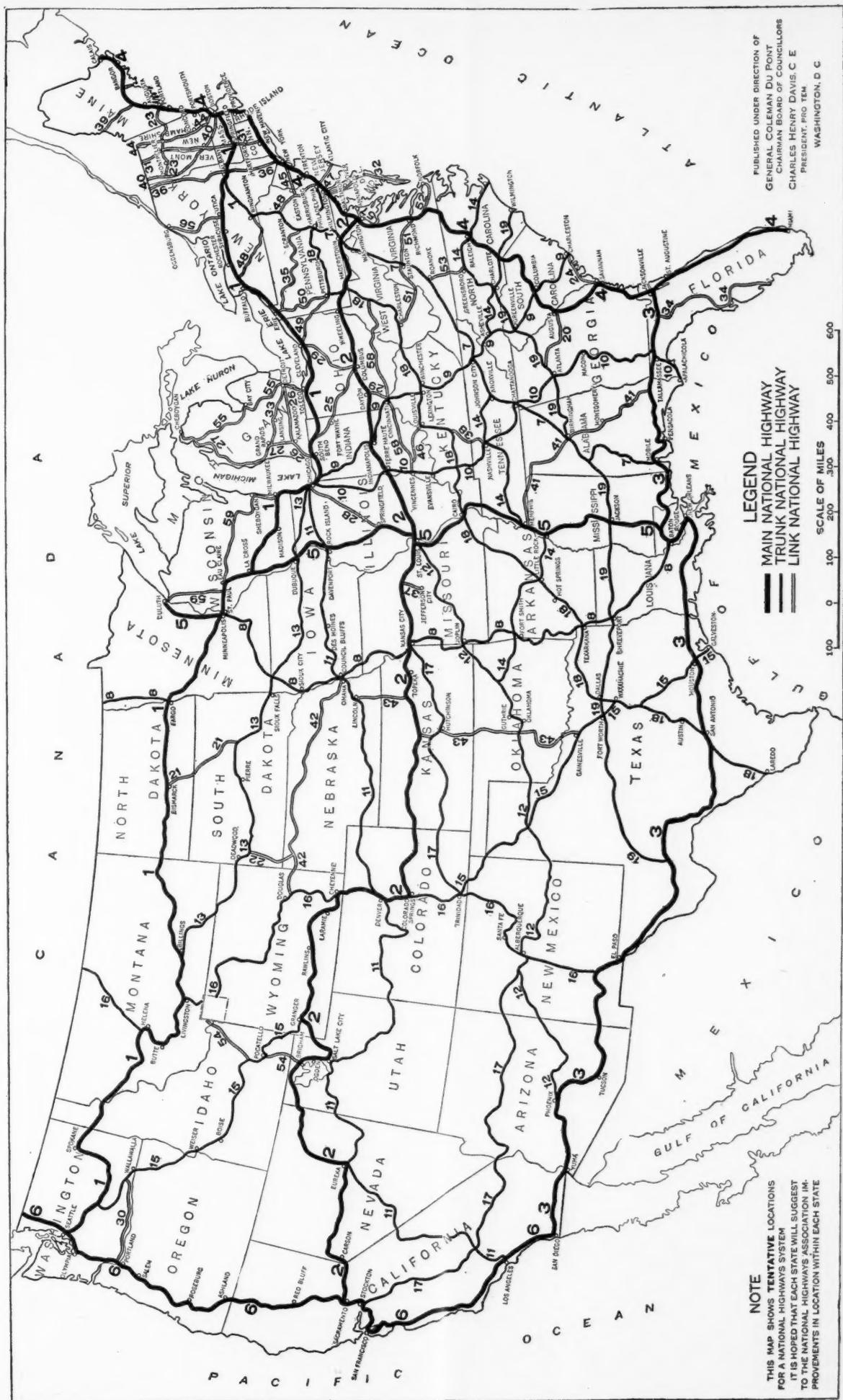
Assuming that the weight on the block of wood was three and one-third tons only (weight probably nearer four tons, since the roller was supplied with water and fuel), the load in the fifth test was equivalent to 1,666 pounds per inch of width of bearing. Looking at it another way the concentrated load was the equivalent of a wagon with four wheels, each with a four-inch tire, carrying a load of thirteen tons equally distributed over the four wheels.

The heaviest load likely to pass over the State highways is the 20-ton traction engine. Assuming that the two rear wheels carry two-thirds of the weight, each wheel would carry 13,300 pounds, and if the wheels are only twenty-four inches wide the weight per inch of bearing is 550 pounds per inch. The weight used in the tests, therefore, was more than three times as great per inch of width of tire as the heaviest load to which the pavement is likely to be subjected.

As a final test, the block of wood was moved to within six inches of the edge of the pavement, so that when the roller wheel ran up on the block it overhung the edge of the concrete by about two inches. In this position the combined weight and the shock due to running the roller onto the block cracked the pavement.

NATIONAL HIGHWAYS.

The idea of a national highway is by no means new; in fact, more than one such highway was constructed during the earliest days of the Republic. The idea was to a large extent abandoned, however, with the introduction of the railway, and it is only within the past few years that it has again arisen as a possibility and has been considered by some even as a necessity. The National Highways Association has published a map of the United States showing a system of national highways covering the entire country and connecting all the states, which it puts forward not as a final and definite proposition, but rather as a tentative suggestion, subject to revision as to details. On the other hand, this map is not merely sketched in by pencil and ruler on a general map of the United States, but each road has been carefully located, being either an existing road or a location decided upon by an engineer working on large scale maps of the several states and aided by correspondence with others interested in the work to the extent of thousands of personal letters. In other words, it is put forward as a suggestion, but one to which has been given the long continued study of experienced men who realize, however, that to such an enormous project the ideas of many must be brought to bear, and



TENTATIVE SUGGESTION FOR NATIONAL HIGHWAYS SYSTEM MADE BY THE NATIONAL HIGHWAYS ASSOCIATION. FIFTY THOUSAND MILES.

PUBLISHED UNDER DIRECTION OF
GENERAL COLEMAN DU PONT
CHARMAN BOARD OF COUNCILLORS
CHARLES HENRY DAVIS, C. E.
PRESIDENT, PRO TEM
WASHINGTON, D. C.

many alternative plans compared and all but the best eliminated.

The highways shown on this map are divided into three general classes: Main national highways, these being numbered from 1 to 6, and being termed the Northern, Central, Southern, Atlantic, Mississippi and Pacific respectively. Second, trunk national highways, these being numbered from 7 to 19 inclusive. And connecting these, link highways, which are numbered from 20 to 59 inclusive.

ROAD TESTING LABORATORY OF UNIVERSITY OF COLORADO.

The University of Colorado operates a laboratory for testing road materials which is believed to be the only such laboratory in the Rocky Mountain region. The first and primary object of this laboratory is to facilitate and improve the regular instruction in highway engineering given at the University; the second is to furnish means for conducting an investigation of the road building materials of the State of Colorado. The latter aim is being gradually accomplished, with the assistance of the State Highway Commission and various county and city officials. The laboratory and course in highway engineering are in charge of Professor M. S. Ketchum and Assistant Professor C. C. Williams of the civil engineering department.

The methods used in this laboratory are the standard tests adopted by the American Society for Testing Materials and by the Office of Public Roads of the U. S. Department of Agriculture. The laboratory contains a Dorry machine for testing hardness; a Page impact machine for testing toughness; a Deval abrasion machine, a Page impact machine for testing cementing value; a standard brick rattler; graduated sieves for mechanical tests of gravel and sand; a consistometer and a tensiometer for determining the characteristics of bituminous materials, together with microscopes, chemical apparatus, and other standard laboratory equipment.

A HORSELESS CITY.

According to a correspondent of the New York Tribune, the police department of Berlin, Germany, has forbidden the use of the streets of that city by horses after April 1st, with a few exceptions. Livermen will be paid a certain amount for the loss which they will probably incur in having to sell their horses and carriages elsewhere. This correspondent says nothing about private vehicles, and it seems possible that the laws of Germany would not permit of refusing the use of the streets by privately-owned horses, but would be confined in its control to licensed renters of vehicles. If all the latter are banished from the city, however, it would certainly make a noticeable difference. There can be no question that the problem of both street paving and street cleaning

would be greatly simplified if horses could be excluded from the streets altogether.

CINDER BASE MACADAM IN ST. LOUIS.

A method of highway construction designed by James C. Travilla, until recently street commissioner of St. Louis, is being applied in the improvement of Goodfellow avenue, one of the streets in the outlying district of that city. Mr. Travilla's plan calls for a cinder base on which is spread macadam and a top coating of torpedo gravel. The unique feature of his method is the provision he makes for drainage. Along either side of the roadway are placed rows of large stones, and the cinder base is spread between these. At intervals of 300 feet lateral drains are located, to permit the moisture to escape after percolating through the cinders.

In using cinders as the road base, about 15 per cent. of clay is incorporated with the cinders, with a view to having them compact and bond better.

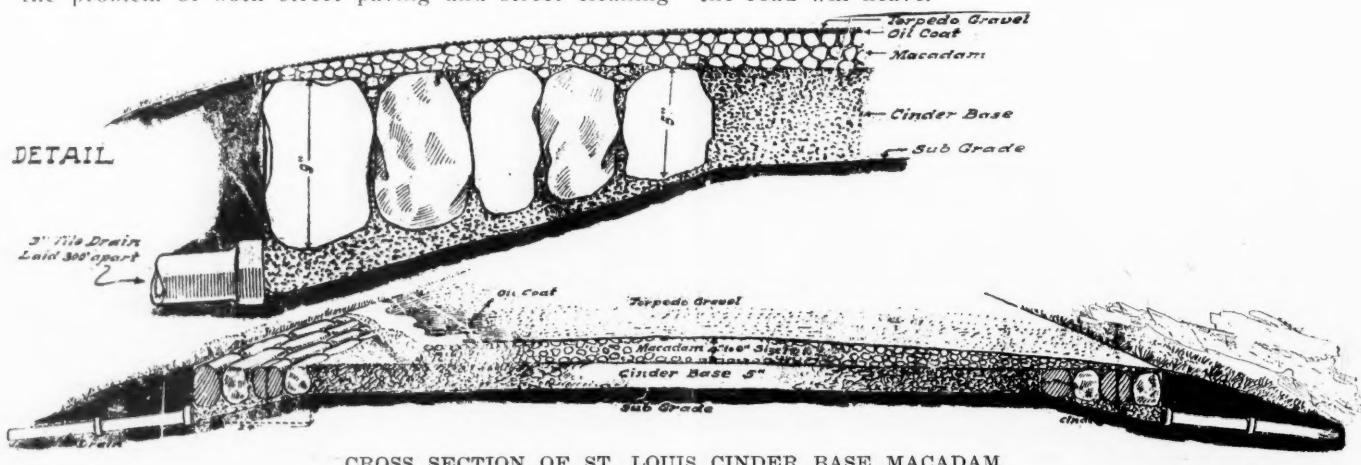


CINDER BASE, GOODFELLOW AVENUE.

On this foundation of cinders is placed macadam to a maximum depth of 4 inches after being compacted. After the voids have been filled the surface is rolled and given a treatment of residuum oil with a final coating of torpedo gravel.

"I regard this as probably the cheapest form of road construction," said Mr. Travilla, "and the results in St. Louis have been extremely satisfactory. The cost of grading, shaping, material and labor will not exceed \$6,000 per mile. The low cost of material was one of the main points I took into consideration in using cinders.

"In constructing the roadway for a portion of Goodfellow avenue, arrangements were made with the street railway to haul the cinders to points near the construction work. The cost of the cinders, delivered, was 25 cents a cubic yard, so that the base was constructed at a minimum cost. If we had used macadam or riprap for the base the cost would have been considerably more. Cinders constitute a by-product and they can be obtained almost anywhere. Clay makes a poor base, as it holds the moisture, and when this moisture freezes the road will heave."



STATE QUARRIES IN WASHINGTON

Five Operated by State to Supply Broken Stone for Roads.—Plant at Each.—Financial Statement of One.

The state of Washington owns five rock quarries at sites selected by Prof. Henry Landes, state geologist, for the superior quality of the stone as road material. The rock at one is feldspathic sandstone, at the others is basalt. Two of these were placed in operation in 1910, the others in 1911.

They were originally designed to provide first class material at low cost for use on state and state aid roads, the general idea in 1910, when they were purchased, being that these would be of bituminous macadam on a macadam base. Since then the state aid law has been repealed, no appropriations for state roads were made in 1911, and several of the counties (which now do work formerly done by the state highway commissioner) have opened quarries of their own.

In addition to these conditions there has been a strong movement toward concrete road construction, allowing the use of gravel instead of crushed rock because of its lower cost or greater accessibility. Orders on the state quarries have therefore been spasmodic and not very large. With the exception of two months out of the eighteen ending September 30, 1912 (two seasons), not more than three quarries were running at any one time, and most of the time only two.

In spite of this, it was possible to operate the five quarries, provide crushed rock to fill all orders received, and to improve one of the quarries at a cost of \$6,000 to put it in better working condition, to do considerable development work at the newer quarries during the winter of 1911-12, and accumulate a surplus of \$4,165.64.

A description of one of these quarries (known as the Meskill quarry) and the figures showing the cost of production there are given below as an illustration of this feature of the state work. These are from the report of W. J. Roberts, state highway commissioner, for the two years ending September 30, 1912.

The Meskill quarry of 160 acres was donated to the state by Lewis county. It is on a branch of the N. P. R. R. and has no water transportation. The power line was built from Chehalis and is about fourteen miles long. Three-phase 2,300 volt current is furnished and the state transforms to 110 volts for small motors and lights.

The crushing plant consists of an Austin No. 6 gyratory, main crusher; Austin No. 6 standard elevator, 68 feet long; Austin No. 6 revolving screen, 20 ft. x 40 ins., three sections; Fairbanks-Morse motor, 75 H. P., oper-

ating main crusher, elevator and screen; Austin No. 3 gyratory-auxiliary crusher for regrinding oversize from No. 6 crusher; Fairbanks-Morse motor, 30 H. P.

The bunkers are of the center loading type with standard railroad clearance. Capacity 750 cu. yds.

The side track is 1,450 feet long from head block to head block, and has a length available for car storage of 1,150 feet, affording room for twelve empty cars and thirteen loaded ones.

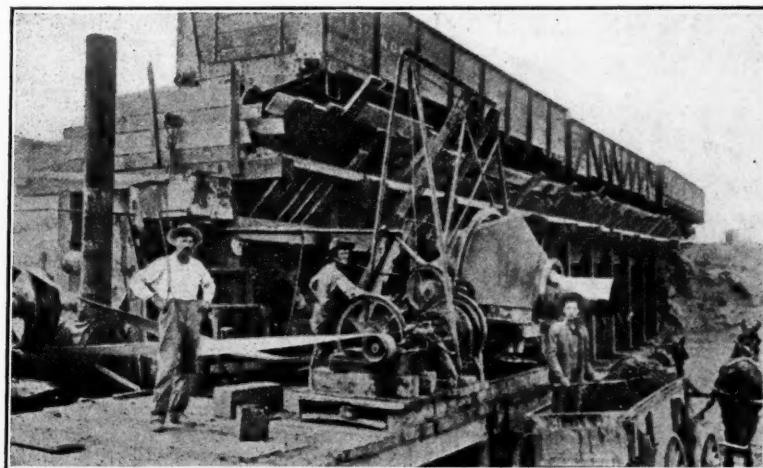
The quarry equipment comprises an Ingersoll-Rand air compressor 12 $\frac{1}{4}$ x12 ins. capable of furnishing compressed air for two 3 $\frac{1}{4}$ -in. drills; Fairbanks-Morse motor, 50 H. P.; two "Wood" air drills; Deane triplex 4x5-in. pump operated at present by air compressor motor and used for washing rock and removing overburden; nine 15 cu. ft. end dump quarry cars; blacksmith outfit complete.

A Buffalo pump 2 $\frac{3}{4}$ x4-in. direct connected to Fairbanks-Morse motor, 3 H. P., supplies camp from well; Fairbanks-Morse gasoline engine, 2 H. P., and pump supplies water for air compressor.

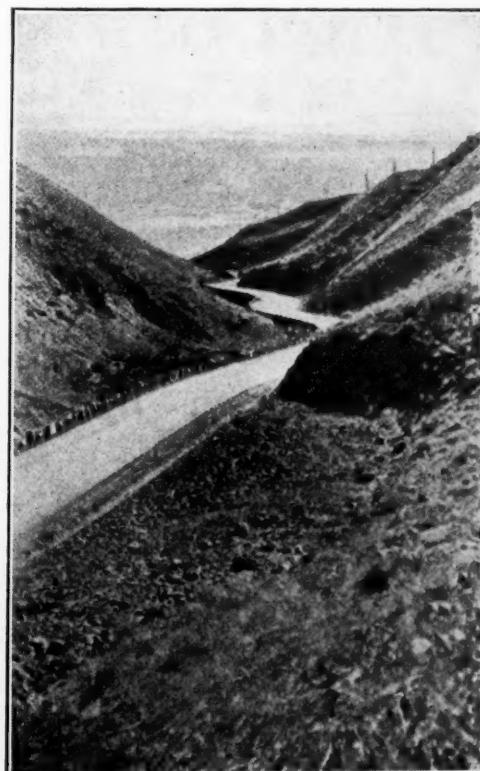
When producing sizes in the proportions for which they were designed, the crushers will grind approximately 250 yards per day. When regrinding for small sizes only, the capacity is materially reduced. Were it not for the toughness of the rock, a greater output could be obtained.

The plant and buildings cost as follows:

Crushing Plant:	
Machinery and tools.....	\$9,930.02
Building (setting machinery, inc.)...	8,999.21
Side track	822.31
Power line	4,000.00
	<u>\$23,751.54</u>
Camp:	
Buildings and stockade wall.....	\$8,062.99
Water supply	533.20
Furniture and camp equipment.....	774.33
	<u>9,370.52</u>
Engineering, supervision and traveling.....	<u>1,877.94</u>
Total	<u>\$35,000.00</u>



ASPHALT MACADAM MIXING PLANT, STATE AID ROAD, WASHINGTON.



ASPHALT MACADAM ROAD, WASHINGTON.

There is given below a record of operation at Meskill quarry for two months. The one for February, 1912, shows a very high cost, while that for September shows a very low cost. No elaboration is necessary to demonstrate that rock cannot be sold on the basis of cost in a good month or in a poor month, but that an average cost must be taken and sufficient profit added to create a sinking fund for the upkeep of plants and the ultimate repayment of their initial cost.

Meskill Quarry, February, 1912.	
Salaries and wages.....	\$396.55
Subsistence.....	178.12
Clothing and shoes.....	19.00
General supplies and expense quarry.....	33.69
Power, light and heat.....	65.27
Repairs.....	.40
Tools.....	5.38
General expenses, Olympia.....	160.53
 Total cost of operation.....	\$858.94
Received from sale of rock.....	360.00
 Operated at a loss.....	\$498.94
Cubic yards rock sold, 500.	
Cost per cubic yard, \$1.72.	

Notwithstanding the low total cost, the cost per cubic yard was high because the orders were light. The spare time of the men was profitably occupied, however, by the removal of overburden, preparatory to the next summer's run.

Meskill Quarry, September, 1912.	
Salaries and wages.....	\$490.00
Subsistence.....	277.77
Clothing and shoes.....	24.86
General supplies and expense quarry.....	91.60
Power, light and heat.....	122.68
Repairs.....	177.26
Medical.....	.50
Tools.....	6.78
Powder.....	111.91
General expense Olympia.....	95.80
 Total cost of operation.....	\$1,399.69
Received from sale of rock.....	3,011.00
 Operated at a profit of.....	\$1,611.31
Cubic yards rock sold, 4,305.	
Cost per cubic yard, \$0.33.	

The organization at the quarry, when running at capacity, consists of seven free men and thirty-five convicts.

The force is made up as follows: Superintendent, clerk, foreman, mechanic and three guards. One guard is on night duty and two are on day duty. All of these seven men, except the guards, would be necessary for the operation of a free labor quarry.

The division of convict labor is as follows:

Camp crew	4
Blacksmith.....	1
Mechanic's assistant	1
Crusher feeder	1
Burley men	2
Quarry	26
Full crew	35

The camp crew consists of a cook, cook's helper, laundryman, and a fourth man who keeps the bunk houses and officers' quarters clean, distributes the coal and wood, and acts in other capacities as a trusty.

The blacksmith sharpens the drill steel and does such iron work as is needed for repairs.

The mechanic's assistant is generally a handy man about the machinery. The paid mechanic, blacksmith and mechanic's assistant are supposed to keep the plant in constant operation, and there have been very few shutdowns for repairs since this plan was adopted.

The crusher feeder distributes the rock into the crusher as it is dumped from the quarry cars, equalizing the crushing strain.

The burley men operate the air drill, bar down loose rock from the ledge, and load railroad cars.

The quarry crew is divided, as a rule, into six groups of four each, with two extra rock breakers. Each group is assigned a station and car and must move its share of the day's output from the quarry to the crusher.

The plan of the Board of Control in furnishing these prisoners is to construe the quarries as parole camps and send men who, after nine months' faithful service at the quarry, are eligible for final discharge.

The men are well fed, clothed comfortably and given springs and mattresses to sleep on. In the summer they have the freedom of the stockade yard, and in winter are free to pass the long evenings in social amusements in the bunk house. It is the freedom of intercourse with each other as compared to the cell life of the penitentiary which they seem to appreciate most, and it undoubtedly has a good effect upon their work.

STATE HIGHWAY DATA

State Aid Appropriations and Expenditures.—Payments by State, County and Township.—Use of Convict Labor.—Road Mileage, Total, Improved and State Aid.—Miles of Improved Road per Capita.

Through the courtesy of the Office of Public Roads of the U. S. Department of Agriculture we are able to publish statistics concerning road work done under state supervision or with state aid in all the states of the country, together with information concerning the employment of convict labor and the road mileage of the state. The data furnished us by the Office of Public Roads is carried up to December 31, 1911, this being the latest which they have compiled—in fact, these have not as yet been published by them, and are subject to revision. Several of the states have not yet compiled the figures for the work of 1912, some of them because the fiscal year for this work did not terminate until quite recently. We have endeavored to extend the data furnished by the government, however, by adding the columns headed "Expenditures during 1912" and "Appropriations for 1913." We have also added to the table a column showing the miles of improved roads per million population of the state. Otherwise, the table is just as furnished us by the department. It will be noticed that of the 48 states, only 35 are

included in this table, since the remainder furnish no state aid in road construction. Of the remainder, Florida provides for working part of the state convicts on roads, but advantage is not taken of this law. Nebraska levies a state tax of 1-5 of a mill to create a state aid bridge fund, but furnishes no other assistance. In South Dakota the only state appropriation is that made for constructing certain roads across state land. Statistics concerning the other states are given in a second table.

The amount of work done in constructing what is known as improved roads in the various states is seen to vary considerably, Kansas having but 0.3 of one per cent of her roads improved, while Massachusetts has 50.2 per cent improved. Each of these are extremes, but percentages extend quite regularly between one per cent and 30 per cent. Greater uniformity is found in the last column which shows the miles of improved roads per million of population in each state. This ratio varies from 279 miles per million in Louisiana to 10,740 in the state of Washington. It is somewhat surprising to find Washing-

DATA CONCERNING ROADS IN STATES WHICH AID ROAD CONSTRUCTION.

State.	State Aid Appropriations and Expenditures.	Appropriations for 1913.		Expenditures during 1912.		Percentage of Cost of State Aid Roads Paid by State.		Convict Labor employed in Road building.		Completed under state aid to Dec. 31, 1911.		Total road mileage in state.		Total improved mileage in state.		Percentage of total miles improved.	
		Total expenditures to Dec. 31, 1911.	Crushing rock.	State.	County.	Township.	State.	Road building.	Crushing rock.	Total road mileage in state.	Completed under state aid to Dec. 31, 1911.	Total road mileage in state.	Completed under state aid to Dec. 31, 1911.	Total road mileage in state.	Completed under state aid to Dec. 31, 1911.	Total road mileage in state.	Completed under state aid to Dec. 31, 1911.
Arizona	\$25,332,64a	\$120,000	\$134,000	50	50	...	...	...	...	49,639	3,780	47.6	1,771	1,336	1,771	1,771
California	403,300.00	2,00,000x	2,00,000	250,000	...	...	...	...	...	50,987	2,273	4.5	1,336	3,612	3,612	3,612
Colorado	1,050,000.00	...	...	b	...	...	...	...	...	48,069	8,588	17.8	1,336	4,159	4,159	4,159
Connecticut	6,200,572.29	1,25,625	1,25,625	E	33 1/3	66 2/3	...	...	...	29,693	4,422	4.2	1,336	2,333	2,333	2,333
Delaware	30,000	30,000	30,000	E	50	50	...	...	...	12,583	3,100	24.5	2,739	4,490	4,490	4,490
Georgia	1,543,809.16	1,543,809.16	1,543,809.16	E	50	50	...	...	...	895	115	3,000	2,043	6,559	6,559	6,559
Illinois	53,000.00	10,000x	10,000x	100,000	...	...	...	...	...	83,986	22,043	26.2	8,949	1,581	1,581	1,581
Iowa	330,000.00	10,000e	10,000e	100,000	...	...	...	...	...	18,403	2,27	2.7	1,166	1,166	1,166	1,166
Kansas	6,500.00m	25,000me	25,000me	...	...	...	...	...	...	9,914	1,02,427	2.4	1,166	1,166	1,166	1,166
Kentucky	120,594.16	120,594.16	120,594.16	n	130,000	130,000	20 to 50	50 to 80	1/3 to 4/7	98,302	3,74	3.8	10,115	18.8	18.8	18.8	
Louisiana	952,209.75	275,733	275,733	...	250,000	2/3 to 3/7	...	...	...	53,744	10,115	4.4	4,417	4,417	4,417	4,417
Maine	7,211,000.00	1,525,549	1,525,549	...	1,644,450	50	...	...	...	24,962	6,463	2.7	2,927	3,297	3,297	3,297
Maryland	8,494,932.70	2,000,000x	2,000,000x	...	552,206	75	25	...	...	25,528	7,691	2.7	3,605	3,605	3,605	3,605
Massachusetts	9,10,000.00r	30,000	30,000	E	30,000	50	50	...	...	16,400	2,156	2.7	2,571	2,571	2,571	2,571
Michigan	360,240.00	30,000	30,000	...	350,000	50	50	...	...	8,674	2,505	2.4	2,700	2,700	2,700	2,700
Minnesota	850,000.00x	80,000xe	80,000xe	...	400,000	50	50	...	...	68,306	7,587	1.0	2,930	2,930	2,930	2,930
Nevada	20,000.00A	45,109	45,109	...	475,000E	50	50	...	...	7,8	6,206	4.4	1,444	1,444	1,444	1,444
New Hampshire	1,265,483.98	783,639	783,639	...	15,00,000x	40	10	...	...	168	4,756	2.7	2,751	2,751	2,751	2,751
New Jersey	3,905,000.00v	87,820ef	87,820ef	...	12,500,000F	50 to 88	8 to 35	1 to 15	...	1,233u	1,233u	1.0	3,507	3,507	3,507	3,507	
New Mexico	47,121,826.14	15,00,000x	15,00,000x	...	50,000	50	25	15D	...	1,144	1,144	1.1	1,705	1,705	1,705	1,705	
North Carolina	13,710.00	5,000	5,000	...	56,945	770,000	50	50	...	1,233u	1,233u	1.0	15,592	19.5	19.5	19.5	
Ohio	2,015,552.19	5,000	5,000	...	5,000	50	50	...	...	1,279	1,279	1.0	3,449	7.1	7.1	7.1
Pennsylvania	5,000,000q	4,401,413	3,067,440	...	3,822,150	100	50	25	25	1,279	1,279	1.0	24,215	27.2	27.2	27.2	
Rhode Island	1,913,933.79	782,832	782,832	...	162,200	48	52	...	...	1,279	1,279	1.0	5,080	5,080	5,080	5,080
Utah	653,632.33	38,000e	38,000e	...	350,000	50	50	50	50	1,279	1,279	1.0	3,215	3,215	3,215	3,215	
Vermont	1,12,928.20	30,000e	30,000e	...	400,000	50	50	...	...	1,279	1,279	1.0	1,711	1,711	1,711	1,711
Virginia	996,245.80	30,000	30,000	...	2,618,500	100t	33 1/3	33 1/3	33 1/3	1,279	1,279	1.0	1,2384	31.7	31.7	31.7	
Washington	2,261,779.65	1,319,018es	1,319,018es	...	828,000	33 1/3	33 1/3	33 1/3	33 1/3	1,279	1,279	1.0	10,167	16.6	16.6	16.6	
Wisconsin	600,000.00	350,000	350,000	...	10,000	10,000	10,000	10,000	10,000	1,279	1,279	1.0	4,354	4,354	4,354	4,354	
Wyoming	...	...	...	...	...	...	...	...	...	1,279	1,279	1.0	2,830	2,830	2,830	2,830

^a—Year ending March 1, 1912. ^b—\$16,000,000 available from 1910 bond issue. ^c—Law changed, 1912, so that State tax is levied to produce State Road Fund of \$250,000 annually. ^d—Trunk lines only. ^e—Appropriation. ^f—To March, 1912. ^g—State tax 1 mill on \$1. Roads paid for either wholly or in part by State. ^h—State pays 1/2 cost of State-aid bridges. ⁱ—Authority of law exists for working part of State convicts on roads but advantage not taken of it. ^j—Estimated value of convict labor, basis \$1 for 300 days, each convict. ^k—Authority of law exists for working part of State convicts on roads but advantage not taken of it. ^l—No specific appropriation for the State Highway Engineer's Office, but an allurement is made from the general fund of the State Agricultural College. ^m—Supplemented by labor of State convicts and surplus revenues of Oyster Commission and the Fish and Game Commission and automobile revenues. ⁿ—Only county convicts are worked on roads. ^o—In but one or a few counties. ^p—In but one or a few counties. ^q—Derived from automobile licenses. ^r—To June 30, 1912. ^s—Law exists, ^t—To June 30, 1912. ^v—For surveys and maps. ^w—Out of 146 counties 116 employ convicts. ^x—Appropriates according to type of road, ranging from 10 to \$1,000 per mile. ^y—County, district, township, or abutting property owners pay other 50%. ^z—Law exists, but not used in 1912. ^A—General Road Fund for maintenance of convict labor. ^B—Exclusive of cost of stone furnished free by railroads. ^C—Varies from 20c. to \$3 for each \$1 locally raised. ^D—10% paid by abutting property. ^E—Not yet made. ^F—In Yellowstone Park only. ^G—For maintenance of State from 1912 not yet made. ^H—In Yellowstone Park only.

DATA CONCERNING ROADS IN STATES NOT GIVING AID.

State.	Percentage of Cost of State Aid Roads Paid by	Convict Labor Employed in		Completed under state aid to Dec. 31, 1911.		Road building.		Crushing rock.		Completed under state aid to Dec. 31, 1911.		Road building.		Crushing rock.		Completed under state aid to Dec. 31, 1911.	
		State.	County.	Township.
Arkansas	a	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Florida
Mississippi
Montana
Nebraska	50	50	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Indiana
Oregon
South Carolina
South Dakota
Tennessee
Texas
West Virginia

^a—Authority of law exists for working part of state convicts on roads, but advantage not taken of it. ^b—In but a few counties. ^c—State convicts may be worked in 4 counties. ^d—Law exists, but not used in 1912. ^e—No specific appropriation, but provision is made for constructing certain roads across state land at state expense.

ton, Georgia and Vermont in the lead in per capita mileage of improved roads and also in percentage of roads improved; also, to find Pennsylvania near the bottom of each list. This means that in the case of the first three, there are comparatively few roads in the state, but a large number of these few are improved; while in the case of Pennsylvania, the total mileage of roads is very high, as is also the total population of the state (due to the several large cities which it contains) both of which tend to lower the relative percentages of the improved roads. As a matter of fact, Pennsylvania, which ranks 32d, has more mileage of improved roads than Vermont, which ranks third. It has, however, less than 1-6 as much mileage of improved roads as the state of Georgia, while the total mileage of all roads is very nearly the same as that in the last named state. It should be noted that a sand-clay road in Georgia is considered an improved road, as well as a bituminous macadam in Pennsylvania.

In most states the entire expense of state aid roads is not paid from the state appropriation, but a certain per cent is paid by the state and the remainder by the county, or township or both. Fifty per cent of the total cost is paid in 10 cases, one-third in 2 cases, three-fourths in one case, the total cost in 2 states, while in the remainder the percentages vary from 20 per cent to 90 per cent. In Illinois the state furnishes crushed stone, machinery and supervision.

Convict labor is employed, or permitted by law to be employed, in 39 states, but in seven of these the use is found in only one or two counties; in five states, while law permits it, no advantage has been taken of it, and in seven other states no use was made of convicts in 1912. Convicts are used in crushing rock for state roads in 16 states, although in 5 of these it is the practice in only one or two counties, while in two others it is permitted by law but was not being employed.

CLASSIFICATION OF STATE AID ROADS

Amount of Each of Several Kinds Constructed in 1912.—Waterbound and Bituminous Macadam

Gravel and Sand Clay Lead.

Figures concerning the amounts of the various kinds of road surface constructed by state aid in the various states during 1912 are given in the accompanying table. Figures for all of the states were not obtainable, but those from two-thirds of the states are shown, and as this includes most of the states where any considerable

amount of such work was done last year, they may be considered as fairly representative of such work throughout the country. It would undoubtedly have been of more interest if figures for all road work—town and county, as well as state—had been given in each case; but there are very few states where such figures are collected, and in most of these they are probably approximations more or less close. It seemed preferable, therefore, to give definite figures concerning state aid roads rather than more or less incomplete guesses concerning total construction. If we consider only the roads outside of city limits, the probability is that the general character of the state aid roads would be of a higher character than those constructed by counties and townships, and would therefore be more representative of the better class of work which was done during the year.

Totaling these figures, we find the various roads dividing themselves into groups more or less definitely. Water-bound macadam, bituminous macadam, gravel and sand clay occupy the first group, the states named having laid over 1,000 miles of each of these. Gravel is slightly in the lead, water-bound macadam and bituminous macadam are nearly tied for second place, while sand clay roads come fourth. In connection with these last, it should be said that much the largest part of them were constructed in North Carolina, where the figures given were those for the entire road construction of the state, the state department in its report not distinguishing between those for which state aid was given and the others; state aid, moreover, consisting in this state merely of the advice of the state engineer and the service of convicts in working the roads. No other class of road reached 500 miles, and only two of them exceeded 70 miles in total length, these being concrete with a bituminous top surface and brick, New York state furnishing by far the larger part of each of these.

It is seen that, in spite of the revolution which the growth of automobiles has made in road construction, gravel and water-bound macadam together constitute more than half of all the road work carried on by state aid in 1912 in the 21 states given in the table. Most of the new bituminous macadam roads were constructed in New York, Maryland and Pennsylvania.

An indication of the tendency of the time in the case of heavy traffic roads may be observed by studying those in the districts around Cleveland, O., and New York City. In Cuyahoga county, O., the total completed roads comprise 218.7 miles of brick, 20.8 of macadam, 7.2 of bituminous, 3.8 of asphalt and 3.8 of gravel. There is under construction 20.1 miles of brick; and there is proposed

KINDS OF ROAD CONSTRUCTED IN 1912 BY STATE AID.

	Earth grading.	Sand- clay.	Gravel.	Mac- adam.	Bitumin- ous mac- adam.	Bitumin- ous con- crete.	Gravel macadam	Brick surface.	War- renite and bitu- lithic.	Bi- tumino- us top con- crete.	Bi- tumino- us sheet asphalt.
Alabama	42.2	...	16.9	4.6	18.9	...	...	...	...	104.5	12.0
California C.	12.8	...	26.9	39.2	...	2.0	0.1	11.5	10.0	...	...
Connecticut	...	...	90%	...	...	...	...	...	...	...	...
Iowa	5,000.0	60.0	25.0	50.0	...	...	...	...	...	...	...
Kansas A.	38.0	...	...	...	...	...	...	...	...	...	...
Louisiana	9.1	...	102.6	3.9	1.1	1.5	...	...	...	...	...
Maine	...	...	23.1	10.6	106.8	...	2.8	...	...	...	1.6
Maryland	4.4	...	78.0	15.0	21.2	1.1	...	...	14.4	...	...
Massachusetts	...	14.5	236.8	100.1	...	16.7	...	...	...	...	...
Michigan	...	35.1	174.3	6.9	...	1.1	...	...	...	...	...
Minnesota	...	...	...	3.0	...	...	...	...	...	...	...
Nevada	...	...	97.0	16.0	...	...	...	...	...	...	...
New Hampshire	...	...	40.0	12.0	12.0	...	5.0	...	2.0	...	...
New Jersey	...	...	150.0	360.0	900.0	30.0	...	128.0	...	35.0	300.0
New York	666.7	742.5	250.0	71.5	21.2	...	...	...	...	...	...
North Carolina A.	...	...	...	44.7	9.7	5.6	...	20.0	...	...	...
Ohio	...	...	...	145.9	99.0	...	50.2	40.0	...	...	2.7
Pennsylvania	...	...	...	8.0	35.0	...	...	...	...	...	...
Rhode Island	387.0	10.0	86.0	16.0	...	1.0	...	...	...	...	...
Utah B.	...	...	170.0	25.0	...	...	...	...	...	...	...
Vermont	150.1	179.2	63.4	146.8	...	...	...	...	...	...	...
Virginia	200.0	...	75.0	150.0	...	10.0	...	...	...	...	...

A—All roads included in quantities given. B—In 1911 and 1912. C—Completed and under way.

The following are reported from only one state each: "Top soil," Alabama, 23.5 miles; "Chert," Alabama, 9.1 miles; "Shell," Virginia, 3.2 miles; "Wood block," Maine, 0.1 mile; "Gravel with glutrin," Connecticut, 37.9 miles; "Petrolithic," Louisiana, 9.5 miles; "Shale," Wisconsin, 15.0 miles; "Sand-oil," Massachusetts, 7.5 miles.

106 miles of brick, 0.8 of concrete, 0.2 of gravel, and 0.2 of slag.

In the First Division of the New York State Highways, which include the roads north of New York City along both sides of the Hudson river half way to Albany, the several kinds of road were laid, and are contracted for the 1913 work, in the following quantities:

	1909	1910	1911	1912	1913
Waterbound macadam	8.1	14.0	4.7	5.9	...
Grouted bituminous macadam	7.5	63.6	61.1	84.4	95.7
Mixed bituminous macadam	2.6	...	...
Gravel bituminous mixed	7.7	4.7	...
Gravel oiled	19.2	...	...
Concrete bituminous top	6.9	18.7	...
Waterbound macadam, oiled	2.3	16.7	12.4
Brick	3.7
Asphaltic block	5.1
Hassam	15.0
Warrenite	24.2

ADMINISTRATION OF STATE ROAD WORK

State and Local Administrative Organizations.—Taxing Abutting Property.—Rural Population, Assessed Valuation, Population per Mile of Road, etc.

In connection with its investigation, the Congressional Committee on Federal Aid in the Construction of Post Roads, has had compiled for its use probably the most complete set of statistics which has yet been got together bearing upon the subject of highways and the various features of the several states which might affect the distribution of state aid by whatever system is adopted, which information was transmitted to the committee by the chairman, Jonathan Bourne, Jr., a few days ago. Here we find tabulated figures giving for each state the area, both total and in farm lands, total and rural population and the population per square mile, assessed valuation, population per mile of road, miles of road per square mile of area and various information concerning the mileage of post roads, postal receipts, etc., these including both totals and the percentages which these are of the totals of the entire country. Also, tabulated comparative statistics of the methods of road administration in the several states; comparative statistics of the amount, cost, administration, etc., of the road systems of eighteen foreign countries, and a table giving costs of various kinds of roads in each of the several states, these costs being, so far as possible, given for each of the several classes of work involved per mile and per square yard. We are reproducing in this issue from the above tables certain sets of statistics which seem to be of most general value and interest.

The first of our tables gives figures which it was thought would probably be used in computing the distribution of federal aid among the several states, although the chairman, in preparing this, did not pretend to anticipate what method would be recommended by the committee. This table gives the per cent which each state bears to the entire country as to area, population, assessed valuation and total road mileage. It also gives the population per mile of road in each state, rural population per mile of road, and the miles of road per square mile of area. It will be noticed that in general the percentage figure representing the total mileage for each state is approximately an average between those representing the area and the total population, and that when this is not the case, it is more nearly equal to the population figure than the area figure. On the other hand, there appears to be very little similarity between the variations in mileage and those in assessed valuation, although, of course, in a general way high assessed valuation is ac-

companied by high road mileage. As an illustration of the lack of parallelism, however, it will be noticed that the assessed valuation of Minnesota is 1.78 per cent while that of New York State is 16.26 per cent while the mileage of the two states is almost exactly the same.

In the other table which we present, a brief statement is given of the road administration in each of the several states, this giving both the state administrative organization and the local organization, the character, the method and the apportionment of state aid. While many synopses of the state highway laws have been published (one of these prepared by us appeared in our issue of May 17, 1911), which are more complete than the brief statements which are necessary in tabulations, this method of arrangement greatly simplifies comparison. The complete table from which we have abstracted these columns also gives, among other things, the kind of supervision of the construction of the roads receiving state aid, from which it appears that such supervision is given by the state highway engineer in Alabama, California, Illinois, Maine, New Mexico; by a state board of engineers through state highway engineers in Kansas; by state engineer for state roads and county commissioners for county roads in Virginia; jointly between the state engineer and the county board of supervisors in Arizona; by the state highway commissioner in Connecticut, New Jersey, Ohio, Pennsylvania and Virginia; by the state highway commission in Maryland, Massachusetts, New York and Utah (in two of these states called state roads commission); by state highway commissioner of the county in Delaware; by the state highway commissioner

(Continued on page 618.)

STATE STATISTICS ON WHICH DISTRIBUTION OF FEDERAL AID MAY BE BASED.

Name of State.	Per cent. of total area.	Per cent. of total population.	Per cent. of total assessed valuation in the United States.	Per cent. of total mileage in the United States.	Rural population per mile of road.	Miles of road per square mile of area.
Alabama	1.72	2.34	0.71	2.12	43.07	35.61
Arizona	3.83	.22	.20	.27	34.15	23.56
Arkansas	1.77	1.72	.60	1.65	43.20	37.64
California	5.25	2.60	4.30	2.19	49.47	18.88
Colorado	3.49	.87	.63	1.35	26.91	13.27
Connecticut	.16	1.22	1.53	.57	88.59	9.13
Delaware	.07	.22	.13	.14	67.44	35.08
Florida	1.85	.82	.32	.80	42.81	30.35
Georgia	1.97	2.85	1.24	3.74	31.73	25.17
Idaho	2.82	.36	.61	.84	17.69	13.89
Illinois	1.88	6.17	3.43	4.28	59.30	22.96
Indiana	1.21	2.95	2.79	3.09	39.72	22.90
Iowa	1.87	2.43	1.05	4.66	21.72	15.10
Kansas	2.75	1.85	4.05	4.47	17.20	12.18
Kentucky	1.35	2.51	1.60	2.44	42.60	32.27
Louisiana	1.53	1.81	.80	1.13	66.36	46.46
Maine	1.01	.81	.70	1.15	29.08	14.14
Maryland	.33	1.42	1.44	.76	77.22	38.07
Massachusetts	.27	3.68	6.20	.78	194.90	13.96
Michigan	1.93	3.08	3.37	3.13	40.78	21.52
Minnesota	2.72	2.27	1.78	3.60	26.17	15.45
Mississippi	1.56	1.97	.58	1.80	45.36	40.14
Missouri	2.31	3.60	2.56	4.91	30.52	17.55
Montana	4.90	.41	.51	1.06	16.12	10.41
Nebraska	2.58	1.30	.68	3.65	14.84	10.97
Nevada	3.69	.09	.12	.58	6.42	5.37
New Hampshire	.30	.47	.58	.69	28.49	11.61
New Jersey	.25	2.77	3.37	.67	170.99	42.44
New Mexico	4.12	.36	.16	.77	19.34	16.59
New York	1.60	9.97	16.26	3.61	114.95	24.25
North Carolina	1.64	2.41	.73	2.19	45.69	39.10
North Dakota	2.38	.63	.43	2.80	9.36	8.34
Ohio	1.37	5.22	9.44	4.04	53.64	23.65
Oklahoma	2.33	1.81	1.95	2.24	23.23	18.75
Oregon	3.21	.74	1.33	1.34	22.82	12.40
Pennsylvania	1.51	8.39	8.73	3.97	87.74	34.72
Rhode Island	.04	.59	.81	.10	255.84	8.46
South Carolina	1.03	1.66	.43	1.46	47.24	40.28
South Dakota	2.58	.64	.52	2.56	10.36	9.00
Tennessee	1.40	2.39	.92	2.09	47.58	37.98
Texas	8.82	4.26	3.71	5.86	30.21	22.94
Utah	2.76	.41	.29	.38	44.87	24.09
Vermont	.31	.39	.32	.65	24.71	12.98
Virginia	1.35	2.26	1.33	1.97	47.50	36.52
Washington	2.25	1.25	1.48	1.56	33.31	15.65
West Virginia	.81	1.34	1.65	1.46	38.01	30.92
Wisconsin	1.86	2.55	3.06	2.78	38.20	21.79
Wyoming	3.28	.16	.26	.48	13.81	9.72
Averages	...	...	...	...	41.81	.739

ROAD ADMINISTRATION IN THE SEVERAL STATES.

State.	Highway administrative organization.		Character and apportionment of State aid.
	State.	Local.	
Alabama	State highway commission of five members. State highway engineer, W. S. Keller; salary, \$4,000.	County commissioners..	State appropriates \$2,000 annually to each county which gives similar amount; said county must build section of road under direction of State highway department.
Arizona	State board of control, consisting of governor, State auditor, and 1 citizen, appointed by governor. State engineer, Lamar Cobb; salary, \$3,000.	Board of supervisors. County superintendent of roads.	Tax shall be imposed to yield \$250,000; 25 per cent. subject to State direction; each county receives back 75 per cent. of amount paid by it.
Arkansas	No State highway department.....	County judges.....	One-fourth of amount paid to State by Federal Government from revenues from forest reserve within State is apportioned to counties on basis of amount of revenue derived from each such county.
California	Highway division of State department of engineering. State highway engineer, A. B. Fletcher; salary, \$10,000.	Board of county supervisors. Bond issues under special highway commissions.	State only assists in trunk-line construction and pays all costs.
Colorado	State highway commission of four members; chairman, C. P. Allen; salary, \$1,200; members' salaries, \$600; secretary and engineer, J. E. Maloney; salary, \$2,500.	Board of county commissioners.	All roads receiving State aid under State highway law are State roads; funds are apportioned to counties according to land area, amount of money expended by it in road construction, difficulty of said work, and extra expense connected with development of new country.
Connecticut	State highway commissioner, Charles J. Bennett; salary, \$5,000.	Board of selectmen of each town.	State roads are paid for by State. State funds are apportioned on basis of taxable valuation of various towns.
Delaware	State highway commissioner for Newcastle County, James Wilson, Wilmington. State highway commissioner for Kent County, C. B. Hope, Dover.	Levy courts.....	An annual appropriation of \$10,000 is made to each county.
Florida	No State highway department.....	Board of county commissioners.	None. Convicts may be used on roads.
Georgia	No State highway department. State Geological Survey, Dr. S. W. McCallie. State geologist, collects data on roads; State prison commission, R. E. Davidson, chairman, has control over State convicts.	Board of county commissioners. Sometimes the ordinary.	Entire State male convict force work roads.
Idaho	State highway commission consists of governor, State mining inspector, and State engineer. State engineer, A. E. Robinson; salary, \$3,600.	Board of county commissioners.	Appropriations are for specific roads.
Illinois	State highway commission of three members. State highway engineer, A. N. Johnson; salary, \$4,000.	Board of county commissioners in some counties; board of township commissioners in other counties.	No money given by State. Engineering assistance and crushed stone from State quarries given on application from local road authorities.
Indiana	No State highway department.....	County commissioners over county roads; township trustees over township roads.	None.
Iowa	No State highway department. State college of agriculture acts as highway commission for educational work. Highway engineer, T. H. McDonald, Ames; salary, \$2,300.	County board of supervisors and township trustees.	No appropriation. Plans and specifications for roads and bridges are furnished.
Kansas	No State highway department. Extension department of State agricultural college provides for State engineer; W. S. Gearhart, State engineer, Manhattan; salary, \$2,500.	County and State highways under county commissioners; county engineer; mail routes and township roads under township board and county engineer.	Educational and investigative work.
Kentucky	State commissioner of public roads, Robert C. Terrell; salary, \$3,000.	County judge appoints county road engineer.	Educational and investigative work.
Louisiana	State board of engineers, 5 members, under which is State Highway Engineer W. E. Atkinson, New Orleans; salary, \$4,000.	Police juries of respective parishes.	State aid is given in order in which application is received from governing authorities in each parish; not more than \$50,000 shall be apportioned to 1 parish during calendar year if other applications are pending.
Maine	State highway commissioner, P. L. Hardison; salary, \$2,500.	County commissioners for unincorporated towns; selectmen for incorporated towns.	State roads are built at cost of State. No aid given to county roads. Town roads receive State aid on basis of taxable valuation and amount locally raised.
Maryland	Maryland State Road Commission consists of governor, 2 members State geological survey, and 3 members appointed. Chairman's salary, \$2,500; 3 other members, \$2,000. Chief Engineer, Henry G. Shirley.	Board of county commissioners; some counties have a board of road directors.	State roads built at State expense; in general, apportionment is on basis of road mileage; State-aid roads, based on road mileage.

ROAD ADMINISTRATION IN THE SEVERAL STATES.—(Continued.)

State.	Highway administrative organization.		Character and apportionment of State aid.
	State.	Local.	
Massachusetts	State highway commission of 3 members, appointed by governor. Chairman, Wm. D. Sohier; salary, \$5,000. Other member's salary, \$4,000.	Usually board of selectmen in each town.	Law requires work of commission be fairly apportioned among different counties.
Michigan	State highway commissioner, Townsend A. Ely; salary, \$2,500.	Township highway commissioners in most counties; in others, county commissioners.	Apportionment depends on type of road. Townships receive aid on not less than 1 or more than 3 miles in one fiscal year.
Minnesota	State highway commission of 3 members. State engineer, George W. Cooley; salary, \$4,000.	Board of county commissioners for county roads; township boards for township roads.	Aid is apportioned on basis of land area of each county, amount expended by it in road construction, difficult work on such road, and extra expense in developing new country. Not more than 3 per cent. nor less than 1 per cent. of highway fund shall be expended in one county during one year.
Mississippi	No State highway department.....	County board of supervisors; bond issues expended by special commission.	None.
Missouri	State board of agriculture. Under its State highway engineer, Curtis Hill; salary, \$2,400.	County court of 3 judges appoints road engineer. In 22 counties, board of township commissioners control.	State funds are apportioned on basis of assessed valuation of property. No county or district shall receive more than 3 per cent. of said funds in one year.
Montana	No State highway department.....	Board of county commissioners.	None.
Nebraska	No state highway department. State board of irrigation has supervision over bridges.	County board of commissioners and township; supervisors elected.	State aid is given only for bridges.
Nevada	No State highway department; State prison commission details convicts for road work. State engineer, W. M. Kearney.	Board of county commissioners.	State appropriates \$20,000 for road fund in equipping and working State convicts on roads; no other appropriation.
New Hampshire.....	State highway department consists of governor and council and State superintendent of highways, S. Percy Hooker.	Board of selectmen or highway agents elected by people.	State aid is apportioned on basis of assessed valuation and amount locally raised. In addition to State aid, the governor and council designate for improvement three continuous highways from the Massachusetts line northerly, and apportion funds equally to each road.
New Jersey.....	State road commission consists of governor, speaker of house of representatives, president of senate, and commissioner of public roads. State road commissioner, E. H. Stevens; salary, \$5,000. State road supervisor, R. A. Meeker; salary, \$4,000.	Board of chosen freeholders in each county who appoint road supervisor and engineer.	No basis for apportionment. Funds shall be distributed among the counties as equitably as possible.
New Mexico.....	State highway commission consists of governor, commissioner of public lands, attorney general, State auditor and State engineer. State engineer, Chas. D. Miller; State road engineer, John D. Meriwether, Las Vegas.	County commissioners and county road board; latter appointed by State highway commission.	No basis for apportionment. Roads may be paid for in part or wholly by the State. Preference in extending aid may be given by State highway commissioner of those counties contributing an amount at least equal to that appropriated.
New York.....	State commission of highways consists of State engineer and surveyor, superintendent of public works, and State superintendent of highways; James H. Sturdevant, acting State superintendent of highways; salary, \$8,000.	Board of supervisors for counties; town board and superintendent for townships.	State highways forming a trunk-line system are paid for by State. Basis of apportionment of State aid is mileage and assessed valuation exclusive of property in cities.
North Carolina.....	No State highway department. State geologist, Dr. Jos. Hyde Pratt, Chapel Hill; salary, \$3,600.	County commissioners for county roads; township commissioners for township roads.	Educational and investigative work. Convict labor is generally used by counties.
North Dakota.....	No State highway department. State engineer, T. R. Atkinson.	County commissioners for county roads; township commissioners for township roads.	None.
Ohio	State highway commissioner, James R. Marker; salary, \$4,000.	County commissioners for county roads; board of township trustees for township roads.	State aid shall be equally divided among counties of the State.
Oklahoma	State highway commissioner, Sidney Suggs; salary, \$2,500.	County commissioners for county roads; township board of trustees for township roads.	Educational and investigative work.
Oregon	No State highway department.....	County courts.....	Convict labor may be used.
Pennsylvania	State highway commissioner, E. M. Bigelow; salary, \$8,000.	Township supervisors, who are elected annually.	State-aid funds are apportioned among counties according to mileage of township and county roads. State highways built at expense of State are trunk lines connecting county seats and principal cities.

ROAD ADMINISTRATION IN THE SEVERAL STATES.—(Continued.)

State.	Highway administrative organization.		Character and apportionment of State aid.
	State.	Local.	
Rhode Island.....	State board of public roads, of five members; John H. Edwards, chairman. Engineer's salary, \$3,000.	Town council, which forms districts and appoints surveyor of highway for each district.	State roads built at State expense; not more than one-third nor less than one-seventh of appropriation to be expended in one county. State aid roads; appropriations apportioned to towns.
South Carolina.....	No State highway department. State commissioner of agriculture, E. J. Watson.	Board of county commissioners and county supervisor.	Collection of statistics.
South Dakota.....	No State highway department. Samuel H. Lea, State engineer.	Board of county commissioners for county roads; township board of supervisors for township roads.	Educational work.
Tennessee	No State highway department.....	County court (judge and 4 members).	None.
Texas	No State highway department.....	County commissioners court.	None.
Utah	State highway commission consists of governor, State engineer, State treasurer, member of faculty of agricultural college, and of faculty of University of Utah; chairman, Wm. Spry; secretary and State engineer, Caleb Tanner.	Board of county commissioners, who appoint county road commissioner.	State aid is apportioned equally among the several counties.
Vermont	State highway commissioner, Charles W. Gates, Franklin; salary, \$2,500.	Board of selectmen for each town.	Basis of appropriation is road mileage, determined by selectmen annually.
Virginia	State highway commission consists of professors of civil engineering from University of Virginia, Virginia Military Institute, Virginia Polytechnic Institute, and one other member appointed by governor; acting State highway commissioner, P. St. J. Wilson; salary \$3,000.	County supervisors.....	State cash fund is apportioned among counties according to taxable valuation of preceding year. State highway commissioner shall give equal service (convict labor) to counties desiring same.
Washington	State highway board consists of governor, State auditor, State treasurer, and member of railway commission; State highway engineer, W. J. Roberts; salary, \$5,000.	County commissioners except in counties where township system prevails.	State roads selected by legislature. Funds under permanent highway law raised by 1 mill tax returned to counties.
West Virginia.....	No State highway department.....	County commissioners, who appoint county engineer.	None.
Wisconsin	State highway commission, 5 members, consists of State geologist, dean of engineering at State University, and 3 members appointed by governor. State highway engineer, A. R. Hirst.	Principally township boards; State aid expended by county highway commissioners.	Apportionment is based on State tax levied in preceding year for all State purposes.
Wyoming	No State highway department. State engineer, A. J. Parshall.	County commissioners..	No State aid except convict labor.

(Continued from page 615.)

through county supervisor and commissioner appointed by town in Vermont; by state and county commissioners in Wisconsin; by state board of public roads in Rhode Island; by governor and council through state superintendent of highways in New Hampshire; by board of county commissioners under supervision and approval of state highway commissioner in Colorado; by county or township official in Michigan; by county, district or city having jurisdiction over road to be improved in Missouri; by county commissioners and state board of irrigation for bridges in Nebraska; by the state through an assistant engineer in Minnesota; while in Idaho a special commission is usually appointed for each appropriation.

Several of the states place some of the cost of road improvement on abutting property, but no tax on abutting or adjacent property is levied in Alabama, Arizona, Arkansas, California, Delaware, Florida, Georgia, Illinois, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Montana, Nebraska, Nevada, New Hampshire, New Mexico, New York, North Carolina, North Dakota, Oklahoma, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Vermont, Virginia, West Virginia and Wyoming. In Colorado, where improvement districts are organized, the cost may be levied on abutting property in proportion to the benefits. In Connecticut, towns, cities and boroughs may

make benefit assessments on abutting property. In Idaho, land within one mile on either side of a roadway may be taxed not to exceed 50 per cent of the road assessment where bonds are issued for building such road. In Indiana, lands may be assessed within one mile of a road on either side in proportion to the situation and benefits. In Iowa, where improvement districts are organized, 50 per cent of cost may be assessed to abutting property according to benefits. In Kansas, on petition of 60 per cent of land owners owning 50 per cent of the land in a certain district, three-fourths the cost of improvements may be assessed against abutting property by county commissioners. In Mississippi, a special tax upon abutting property can be levied only upon petition of property owners affected. In Missouri, special road districts may be formed. In New Jersey, 10 per cent of the township's cost may be assessed against abutting property. In Ohio, 10 per cent of the cost of roads may be assessed against abutting property. In Rhode Island, a general council may tax abutting property receiving benefits from road or street improvements. In Utah, in road districts, 25 per cent of cost of road may be assessed against abutting property. In Washington, a tax may be imposed upon abutting property when owners of said property petition for improvement. In Wisconsin, abutting property may be taxed, but the details were not given.

CHANGE IN KENTUCKY ROAD LAW.

A measure providing for a state commissioner of public roads to be appointed by the Governor on or before July 1, 1912, and every four years thereafter, to act in the capacity of adviser to the county and township highway authorities, was passed by the Legislature in March, 1912. The law provides for the employment of expert road engineers and appropriates \$25,000 for the maintenance of the state department.

Highway work is in charge of county fiscal courts, consisting of the county judge and from five to eight justices of the peace in different sections of each county. These officials are elected by popular vote. County judges are elected for a term of four years. The last election was in November, 1909. County road engineers,

reputable civil engineers or practical road builders with two years' experience, who shall have passed a creditable examination before the state commissioner of public roads, or one of his representatives, are appointed in each county by the county judge, with the approval of the Fiscal Court (appointments expire in two years—that is, on Oct. 1 of even years), which also purchases all machinery and materials and levies taxes. Highway improvement is ordered by the court upon application by the people along the line of proposed improvement.

Money aid was formerly granted in Kentucky, and a considerable mileage of stone and gravel road was constructed under its provisions, but changes made in the constitution a few years ago prevented a continuance of the system under which it was conducted.

SYMPOSIUM OF FEDERAL AID IDEAS

Opinions of Forty Road Officials and Others Concerning Federal Aid in Road Construction.—Class of Roads to Receive Federal Aid.—Amount to Be Given for Construction or Maintenance.

We present in tabulated form replies of 40 different individuals in 25 different states to questions submitted to them by the Congressional Committee on Federal Aid in the Construction of Post Roads. These, as might be expected, show a great diversity of views—in fact, probably represent most of the ideas worthy of consideration which are held on the general subject of federal aid in road construction. Very few seem to have any definite scheme for the organizing of a federal department or the exact relation between such department and the state or local authorities to which federal aid would be given. More definite seem to be the ideas as to the amount of aid, the majority suggesting that the government pay half the cost of certain roads, the other half to be paid either by the state alone or by state and local authorities. As to whether the aid of the federal government should be extended to construction or to maintenance, the majority believe that both should be included, but a number think that construction only should receive such aid.

Several of those replying had quite diverse ideas on one or more questions asked, and we present below quotations from replies which are representative. It is seen that some consider that federal aid should be confined to interstate routes, several holding that such roads should be built and maintained wholly by the federal government. Others would have federal aid extended to post roads only, while perhaps the larger number would extend the aid to selected roads from practically all classes. Certain of the state commissioners have indicated some jealousy of the state authority, and recommend that the expenditure of the money given should rest entirely with the state highway department. The majority, however, hold that the federal government should have greater or less supervision over the construction of the roads, generally to the extent of approving specifications and plans under which such work is to be done, and several believe it should have the right to accept or reject a completed contract.

Among some of the ideas which appear to us worthy of special consideration, one is that of apportioning the federal aid according to the needs of the district. Several suggested the assessed valuation of the state as a basis of distributing federal appropriations, but this appears to us altogether wrong in that, if anything, the poorer states need and should receive the greater amount of aid. Some years ago one of our largest cities used to "design" its sewer system by placing in each block the largest sewer which could be built with a certain percentage of the valuation of that block, but we doubt whether this method could find any defenders at the

present day. We do not believe that any city of this county would think of putting the cheapest class of pavements in the poorest districts of the city simply because they are the poorest, although they might do it in some cases because the traffic requirements are the least exacting. It would seem as though the logical method would be to distribute to each state appropriations proportionate to the needs of that state, at least so far as providing for through routes of travel are concerned. (A similar idea is embodied in the new Minnesota road law of April 15, 1913, which provides that state aid for county road work shall be given to the extent of 80 per cent where the assessed valuation of the county is less than \$5,000,000; 70 per cent where it is \$5,000,000 to \$10,000,000; 60 per cent where it is \$10,000,000 to \$15,000,000; and 50 per cent where it exceeds \$15,000,000.)

Several representatives of various state highway commissions realized the importance of maintenance and called attention to the desirability that federal aid be extended to this as well as to construction. In some of the older states improved roads have already reached such a stage, both of wear and of mileage, that a large part of future expenditures on highway work must be for maintenance rather than for new construction. Should federal assistance be used to encourage construction only, it is almost certain that many states would allow roads to fall into disrepair, unless compelled to keep them in a fair state of efficiency. A good suggestion appears to be that of giving the federal government supervision over repairs to the extent that, if they are not properly kept up by the state authorities, the federal authorities may use in such work appropriations which otherwise would have been employed for constructing new roads.

There are such excellent arguments in favor of giving the federal government complete charge of national interstate highways, both as to original construction and as to subsequent maintenance, that it seems probable that a system of such highways will be constructed and maintained by the federal government affording several routes across the country, both east and west and north and south. As to what extent federal aid will be given to other highways, there seems to be nothing at present to indicate the conclusion which will be reached by Congress, but the enormous amount of interest which is felt in the subject throughout the country, and the attention which is being paid to it by Congress itself would seem to indicate that some legislation providing for federal aid will materialize at the next session, if it does not at this.

OPINIONS GIVEN BEFORE CONGRESSIONAL COMMITTEE ON FEDERAL AID IN THE CONSTRUCTION OF POST ROADS.

General Plan for Giving Federal Aid.	Amount of Federal Payment.	Character of Roads Given Federal Aid.	Federal Aid for Construction or Maintenance.	Extent of Federal Supervision.	Detail Plan for Federal and State Cooperation.
Arizona: Lamar Cobb, state engr.	National comm., with a member for each of 9 districts. Agreements with state departments about expenditures	50%	Through routes outside Construction, with Federal supervision through-National commission should of cities	power to compel out	work out details.....
Colorado: L. K. Dieterich.....	Build up dept. of experienced men; do work by day labor.....	.....	National and post.....	Both.....	Federal supervision through-Model department after Panama organization.....
C. W. Beach, civil engr.	Federal aid in connection with state and local contributions.....	Batch $\frac{1}{8}$	Through routes	Both.....	out..... Approval of routes, plans and finished work
Connecticut: J. H. MacDonald, state Federal agent in each state with highway commr.....	Authority to approve and accept work	50%	Trunk, inter-town and feeder.....	Both.....	Approval of specifications and work
Florida: Wm. M. Corry.....	Cooperation in building.....	Fixed sum per Post roads .....	.....	Both.....	Supervision and inspection
Illinois: A. N. Johnson, state Cooperation with state highway dept. Aid for a definite system of roads	% to $\frac{1}{4}$	Through routes; 1% to 2% of total mileage.....	Both.....	General supervision; full control or maintenance	National bureau; division engineers; federal approval of specifications; state progress reports; federal acceptance
Indiana: C. A. Kenyon, pres. Ind. National dept. to build and maintain trunk lines. Aid for other roads	50%	Selected roads, about 2% of mileage.....	Both.....	Construction and supervision.....	National highway board, subdivided into bureaus
C. G. Fisher.....	Plan to promote inter-state travel.....	75%	Inter-state of permanent construction.....	Construction	Supervision of specifications
Kansas: C. W. Barnes, pres. Kan. Auto. Assn.....	Any workable plan.....	50%	.....	Both.....	General supervision
J. C. Nicholson.....	National highways under bonus system	10% to 25% per \$10 or \$20 per mile.	Permanent constructn. Both.....	.....	None
C. F. Osborn, county engr.	.....	50%	Mile routes	Maintenance	None
R. H. Foxon.....	Cooperation	50%	Trans-continental	Construction	Supervision of federal engi-Office of Public Roads or De-
Arthur Capper	Contribution to states having highway departments	50%	.....	.....	Supervision of Public Works. Appropriations according to mileage
W. B. Harris, county engr.	Contribution for important highways.....	50%	Permanent constructn. Construction .....	.....	Construction and
.....	.....	50%	Inter-town highways .....	.....	years of main-Approval of plans, specific-Consti-tution would prevent tenance
Kentucky: R. C. Terrell, comr. of public roads	Appropriation	$\frac{1}{2}$ to $\frac{1}{4}$	Inter-county thorough-fares	Both.....	Supervision of location and construction
Maine: P. L. Hardison, comr.	Distribution of fund left to federal highway dept. government	50% or less	State dept. to submit plans for highway department	Both.....	Approval of supervision and maintenance
Maryland: O. E. Weller, chairman, Construction and maintenance of state roads comm. ....	.....	All	Inter-state highways	Both.....	General supervision by Federal authorities
Massachusetts: W. D. Sohier, chairman, Contribution for roads selected by highway comm. state and approved by federal department .....	.....	$\frac{1}{2}$ to $\frac{1}{4}$	.....	.....	Approvals & approval of work locations & approval of state supervision
Mississippi: G. A. McHenry, secy.	Contribution in proportion to local road comm. bond issues, where there is proper supervision	20%	Post roads	Both.....	Approval of local petition by Office of Public Roads. Advance & supervision by same

OPINIONS GIVEN BEFORE CONGRESSIONAL COMMITTEE ON FEDERAL AID IN THE CONSTRUCTION OF POST ROADS.—(Continued.)

General Plan for Giving Federal Aid.	Amount of Federal Payment.	Character of Roads Given Federal Aid.	Federal Aid for Construction or for Maintenance.	Extent of Federal Supervision.	Detail Plan for Federal and State Cooperation.
Missouri: G. Griggs.....	1/3	Permanent construct'n. Both.....	.....	Supervision of construction; local maintenance.....	Federal classification of roads; state dept. select roads; federal approval of finished work.
New Hampshire: F. Hooker, state supt. Contribution through state dept., on basis of mileage of through roads.	50%	Selected by state.....Both.....	.....	Federal local representative should approve	Federal classification of roads; state dept. select roads; federal approval of finished work.
New York: Gordon Reel, supt. of Consideration of stage of development of highways.....ment of state systems. Maintain existing and construct new roads. Graduated scale. Municipalities .....Both.....	.....	.....	.....	.....	Federal Highway Dept. Construction by state dept. Federal Highway Dept. Designation of federal highways by state.
North Carolina: Leonard Tufts .....Contribution for limited number of through highways.....	50%	or more. Through highways.....Both.....	.....	.....	.....
3. Cameron .....Contribution	50%	National roads and mail routes .....	.....	.....	.....
3. D. Pearce.....Distribution of funds by area.....	20%	Both.....	.....	.....	.....
North Dakota: R. Atkinson, state Aid for inter-state roads located by state commissioners and Office of Public Roads	50%	Permanent construct'n. Construction .....	.....	.....	.....
Ohio: A. H. Hinkle, mainten- ance, deputy state National system of roads, disregarding state boundaries	1/6	Post roads .....	.....	.....	Initiation through state dept.; approval by federal dept.
3. H. Eno, state university	50%	Main traffic .....	.....	.....	.....
W. P. Blair, Secy. N. P. B. M. A. ....Contribution for post roads.....	50% to 75%	Chief market roads.....Construction .....	.....	.....	General supervision construction by state
Oregon: J. L. Bowby.....National trunk highway system.....Varying amounts.	.....	Highest class construc- tion .....	.....	.....	.....
South Dakota: H. Lea, state engr. ....Aid with due regard to local con- ditions	50%	Inter-state highways.....Both.....	.....	.....	.....
National comm. to locate, build and maintain national highways.....	All.	Inter-state highways.....Both.....	.....	.....	.....
Texas: D. B. Colquitt.....Cooperation of federal, county and local authorities 'highway dept.'.....	.....	High class roads.....Both.....	.....	.....	.....
3. J. Potts, State Agri-Aid through state highway dept.; federal approval of state plans.	1/6	Permanent construct'n. Both.....	.....	.....	.....
Vermont: O. T. Perry, county supervisor... with state, counties and towns... .....	.....	.....	.....	.....	.....
Washington: W. J. Roberts, state Aid for trunk highways approved by federal government .....	.....	.....	.....	.....	.....
Wisconsin: A. R. Hirst, state high-Aid according to fixed rules; trunk highway commr. ....	.....	.....	.....	.....	.....
Wyoming: A. J. Marshall, state Roads selected by federal authority in agreement with state comm... .....	.....	.....	.....	.....	.....

QUOTATIONS FROM REPLIES

QUESTION 1.

A national highway commission of engineers, about nine in number, should be created to administer any federal aid law. In the selection of these commissioners the states of the union should be subdivided into as many districts as there are members and one member appointed from each district. The districts should be of about the same size, considering population and area, as the controlling factors in so determining. The boundaries may be defined in the law or the appointing power be directed to so district the union. This commission should be directed to act in conjunction with the highway departments or state engineers in the various states of the union in the selection of national highways, upon which federal aid is to be expended. And they should be directed to select such state units, as will coordinate into a national highway system. No state should receive aid until it has established a highway department.—Lamar Cobb, state engineer, Arizona.

To meet the popular approval a bill will have to be drawn, in my judgment, that will not deny either the trunk lines or the tributary roads their proportion of whatever appropriation is made by the United States government; nor, in my judgment, can a bill be drawn to receive popular support that will specialize or restrict in any way the distribution of federal aid for highway construction upon any one particular class of trunk lines. In other words, a bill to meet popular approval should call for a division of the money upon two or three classes of roads, as follows:

Class No. 1.—The great arteries running through and into other States, but not distorted, nor in obedience to any political arrangement, but embracing as far as possible, in a direct course, the principal cities east and west and north and south; having as many of these direct trunk lines as the committee may consider wise under a general plan carefully thought out before commencing to extend Federal aid, or as the exigencies of the case may suggest and money can be had to extend the work.

Class No. 2.—The intertown roads—commonly called main highways connecting a town with adjoining towns—running through the several States and having a direct connection with these main trunks.

Class No. 3.—The side, or feeder, roads leading into the intertown roads, and they, in turn, leading into the great trunk lines.—J. H. Macdonald, formerly State Highway Commissioner of Connecticut.

I am of the opinion that it would be necessary to have a well organized state highway department in each state, with whom the government would deal directly; that federal aid should be confined to a certain definite system of roads, if granted at all; that maintenance of these roads should be at the expense of the government when once constructed; that the specifications for the construction should be drawn up in consultation with the state department, which doubtless will be able to give valuable aid that would take into account local conditions; that the government give only general supervision to the work sufficient only to insure itself as to the general value of the construction undertaken; that the detailed supervision could more cheaply be left to the state highway departments of the various states.—A. N. Johnson, state highway engineer, Illinois.

In my opinion (a) the nation should have a national highway department; (b) there are a few great trunk lines that are of such vast importance that I think the nation should construct and maintain without the aid of the states. Aside from these routes, federal aid to the extent of one-half the cost of construction and upkeep should be granted, provided, however, that such aid should not be extended to roads other than post and interstate roads. A comprehensive definition of what shall constitute such roads, and a tribunal to decide the question should be provided. Probably a limit of mileage of

such roads that should be built in each state (say not to exceed 2% of the roads of the state) would prevent extravagance. Experiences in the various states having highway commissions and state aid indicate that it is not safe to depend exclusively upon local authorities to maintain adequately roads built with the aid of state money. Witness the collapse of the "Cumberland Road" after it was turned over to the various states.—C. A. Kenyon, Indiana.

In my judgment not one dollar of federal aid should be given anywhere for roads unless it is required by law to be spent upon some particular road or roads, selected by a competent federal road or engineering department in conference or agreement with some department of like character in each state. . . . If, as is done in France, the necessities of the community and its ability to contribute were to be taken into account, as would seem fair in determining what proportion of the cost it ought to be called upon to provide, the valuation of the county or municipality in which the road was located, divided by the miles of road it had to care for, might be used as a fair measure. The required contribution being less and the "federal aid" more when the valuation per mile of road was small and vice versa as such valuation per mile increased.—W. D. Sohier, chairman Massachusetts highway commission.

All roads within a state should be classified into five classes. 1. Municipal or compact portion. 2. Through roads. 3. Secondary roads. 4. Subsidiary roads. 5. Local roads. Classes 1 and 5 should receive no federal aid and should not be considered in the total state mileage. The classification of such roads should take into account: (1) Population, (2) volume of local traffic, (3) volume of through traffic. The latter to be determined by the particular circumstances which will tend to make this road particularly needed as an adjunct to interstate and interurban traffic. A system of units might be devised which would establish a mathematical system by which the classes of roads might be determined.—S. P. Hooker, superintendent of highways, New Hampshire.

A general plan should be sufficiently broad in its scope to allow the proper exercise of discretionary authority on the part of the federal department charged with its execution. The expenditure of money appropriated for federal aid should be conditioned upon some schedule of co-operation with the state or community that is interested. It would be advisable to designate the conditions upon which federal aid would be given and the extent of such aid within certain stated limits. One condition of federal aid should be the establishment by the state of a highway department, with authority to co-operate with the agencies of the federal government and to formulate the necessary rules and regulations for road work in the state.—S. H. Lea, state engineer, South Dakota.

I have some doubt as to the wisdom of the federal government participating in a matter of this kind, but if it does, I think it should supplement the efforts of local authorities. In Texas good-road building is under the jurisdiction and control of the commissioners court of each county. Our law provides for the voting of bonds by counties and by precincts in counties. The state does not have supervision or control over the building of good roads in Texas. If the federal government engages in good-road building, or makes appropriations for this purpose, laws should be passed adequately protecting the proper expenditure of such money, as a matter of course. I think the local or county authorities, in most instances, will be glad to co-operate with the federal or state government in the building of good roads. This answers your first and second inquiries.—O. B. Colquitt, Texas.

QUESTION 2.

(In nearly all cases the proportion of 50 per cent. is designated as the share of the federal government. The

following also serves to express a prevailing opinion:)

As the matter has never been brought before the people of this state, it is impossible to say what proportion they might be willing to contribute. It is probable, however, that they would take whatever was available, even though they were opposed to the policy of federal aid in general.—A. J. Parshall, state engineer, Wyoming.

QUESTION 3.

I would have the basis of award the wealth of the town when it comes to a division of the second class, or inter-town roads, as arranged for under the Connecticut plan.—J. H. Macdonald, formerly state highway commissioner, Connecticut.

These roads should be selected by the state highway department and referred to the federal authorities for their approval, and the class of road required should be recommended by the highway board. The proportion of the various classes of roads to be built might be based on road mileage, or area.—P. L. Hardison, highway commissioner, Maine.

To build a system of national roads to be laid out and adopted, at least in a general way, when the appropriation is made. Such a system of roads should be chosen regardless of state boundaries. With reference to the distribution of the appropriation, state boundaries should not be considered except, possibly, to provide for a fair distribution of the funds over the accepted system of highways.—A. H. Hinkle, maintenance deputy, Ohio.

I believe the roads to be chosen should be main traffic roads between cities of large population and, so far as possible, directly in line and continuations of roads to be so developed in other States. To illustrate—such roads in Ohio as the Old National Pike and other roads that might connect from Buffalo through Cleveland and other points west in Indiana and Illinois should be chosen. Generally east-and-west roads should be given preference over north-and-south roads, although a few north-and-south roads should be chosen throughout the United States.—P. H. Eno, State University, Ohio.

QUESTION 4.

Most important, some adequate provision should be made for the maintenance of the road when completed. The expense could be paid by the same parties and in the same proportions as the construction, but the Federal department should have authority to require the necessary repairs to be made, or, if they were not made, to have them made, with some provision whereby the Government could collect from each of the other contributing parties their proportion of the expense.—W. D. Sohier, chairman Massachusetts highway commissioners.

In my opinion federal aid must necessarily be applied to both construction and maintenance as, for example, presumably, the system of highways eligible to receive federal aid in the State of New York will in the very near future all be improved highways of a high class. In some of the other States a very large percentage of the mileage which would naturally come within the scope of a "federal aid" plan must, for a long time, consist of earth roads, and some of these extremely poor quality; consequently the federal highway department should be, in my opinion, allowed to exercise its discretion as to the amount per mile to be expended, both in determining the character and amount of improvement and the character and amount of maintenance which should be applied to any road within the scope of the "federal aid" plan.—C. G. Reel, formerly superintendent of highways, New York.

A state granted federal aid should be required to contribute to the amount of money appropriated in accordance with its ability to pay. In other words, the rich states, such as New York and Pennsylvania, should be required by law to appropriate at least an amount of money per

mile per year equal to the amount of federal aid, and the poorer states, with a low assessed valuation per mile, should be called upon to appropriate an amount per mile per year varying in accordance with the assessed valuation of the state per mile, this contribution to be at the rate of 100 per cent., 90 per cent., 80 per cent., 70 per cent., 60 per cent., 50 per cent. of the amount of federal aid per mile per year.—P. D. Lyon, formerly deputy commissioner, New York.

The amount of appropriation should be limited definitely to construction alone. The question of maintenance should be a question separate and apart from construction and become the subject of special legislation and provision. Where the government can and is willing and the states coincide with such judgment, and where roads of the most permanent character are built, then the government should assume their maintenance. If, however, states are unwilling to appropriate sufficient money to build such roads in cooperation with the government, or where roads of secondary permanency are built, or less permanent, and doubtful character, then the burden of maintaining such roads should be upon the states.—W. P. Blair, Ohio.

Maintenance may be considered as being of equal importance with construction, since no road, however well built, will remain good unless properly maintained. Road work is largely maintenance, and no system of roads should be constructed unless adequate provision is made for maintenance.—T. H. Lea, state engineer, S. Dakota.

QUESTION 5.

Either construction or maintenance should have the approval of the federal authority, but I think this could be done by the local authorities in all of the states which have highway departments. States not having highway departments would naturally require more supervision than those which have these organizations.—P. L. Hardison, state highway commissioner, Maine.

I believe that federal supervision should extend to the selection of the roads and the approval of the construction, both in the preparation of the plans and in the prosecution of the work, but that the direct control of the construction should remain in the hands of the state highway commission, whose members and employees would probably be more familiar with local conditions than any other organization.—A. R. Hurst, state highway engineer, Wisconsin.

Federal supervision should be given in construction and maintenance throughout.—L. K. Dieterich, Colorado.

QUESTION 6.

If any county or good-roads district, or even an entire state, is sufficiently interested in the building and keeping up of strictly highclass roads, to expend, or be willing and ready to expend, an appreciable amount, say not less than \$50,000 or \$100,000 in one immediate locality, in the proper construction of the same, then the federal government might profitably join the local authorities to the extent of from 10 to 25 per cent. of the cost and supervision in the work of laying out and construction of the roads, under certain understood and agreed-to stipulations favorable to the best interest of the counties or good-road districts.—Herbert Gillis, clerk county supervisors, Mississippi.

In this state the engineers of the highway department, after a given road is selected and agreed upon, could furnish plans and specifications for either construction or maintenance. The federal government might adopt standard specifications for different classes of work. When the proper type has been selected by the state highway board the plans prepared by the state department could be sent to the federal board for approval or modification. The federal authorities could then agree to

pay their part of the cost of the road upon estimates made by the state highway department from time to time. These estimates should show the actual amount of work done, giving quantities and rates, the partial payments being for 80 per cent. of the work already done, the other 20 per cent. being retained until 30 days after the contract has been completed.—W. J. Roberts, state highway commissioner, Washington.

The details of operation of a system of federal aid to road construction would work out naturally between the government officials in charge of the road work and the various state highway departments. The inauguration of federal aid would encourage the establishment of state highway departments in those states which have not yet advanced that far in modern road building.—H. L. Bowby, Oregon.

QUEENSBORO MAINTENANCE WORK

Resurfacing Penetration Tar Macadam Road by Municipal Force.—Method and Cost.—Resurfacing Water-Bound Macadam.

The Highway Department of Queens Borough, New York City, does extensive maintenance work by the direct labor system and maintains a well organized force of men and equipment. One of the points at which work is now being carried on is Hillside avenue, Jamaica, adjoining the sections of the experimental road, which was described in the Municipal Journal September 26, 1912. Observations of traffic records made on this road averaged for a period of seven days showed a count of 1,600 vehicles, about two-thirds of which were automobiles.

The history of the section which is now being repaired by the tar surfacing method is this: Four years ago the roadway, trap rock macadam, was practically worn out and required resurfacing. It was resurfaced with tar macadam penetration. For the following two years only minor repairs were made. Last year it was given a light surface treatment and this year it is being surfaced over again.

The method in general is the ordinary one, but in certain minor details of management may vary from practice elsewhere. The surface is swept first, of course. Barrels of tarvia A are distributed along the sides of the road about as they will be needed. All crushed stone is also delivered in advance, so there is no waiting for material when the work once starts. If any deep holes are found, as about manhole covers, they are repaired well in advance with coarse stone and tar. The gang consists of eleven men and a foreman. The equipment includes two horses and carts, two one hundred gallon Sweeney & Gray tar kettles, several Perfection pouring pots, a Monarch macadam roller and minor tools. In this instance only part of the time of the roller is charged to this job, because a tar macadam reconstruction job is going on on an adjoining parallel street and the roller takes care of both jobs. One side of the street is repaired at a time. In fact, a strip from three to six feet wide in the center of the roadway does not need any



SPREADING THE TAR.

treatment in most places. One cart pulls the tar kettles along and carries wood. The other cart brings the stone to convenient points for the men to spread. Tar is poured in a strip, forming a patch perhaps ten or fifteen feet long, which is immediately covered with stone. Although the stone does not seem to be well bedded the roller does drive them down and gives them a good hold. Very little stone comes loose afterwards under traffic in spite of the large size (3/4-inch) used. At street crossings sand is spread over the stone to absorb surplus tar. This, though a small matter, is a means of avoiding many complaints.

The following items of cost give an idea of the mod-



SPREADING 3/4-INCH STONE ON THE TAR.

erate expense of this sort of work. The work done in a day was a strip 900 feet long by 20 feet wide, say 2,000 square yards. The cost items were about:

11 barrels Tarvia A, at about \$4.....	\$44.00
43 1/2 cubic yards stone, at \$2.....	87.00
11 men, at \$2.50.....	27.50
Foreman	5.00
Roller	5.00
Fuel and sundries.....	5.00
	\$173.50

On this basis the cost is 8.7 cents per square yard.

(Continued on page 626.)



OLD MACADAM SCARIFIED AND SHAPED BY ROAD GRADER.



METHOD OF MOVING KETTLES, TARVIA SURFACING.

Municipal Journal

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CHANGE OF ADDRESS

Subscribers are requested to notify us of changes of address, giving both old and new addresses.

Contributions suitable for this paper either in the form of special articles or of letters discussing municipal matters, are invited and paid for. Subscribers desiring information concerning municipal matters are requested to call upon MUNICIPAL JOURNAL, which has unusual facilities for furnishing the same, and will do so gladly and without cost.

MAY 1, 1913.

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HIGHWAY COSTS.

The several tables and articles in this issue contain a great amount of information of various kinds concerning highways, but in none of these are figures of costs given, other than total annual appropriations. The reason for this is not that no figures of this kind were available, but that, in our opinion, they are in most cases practically useless for almost any purpose except in balancing the accounts of the highway officials. In the first place, most of the state reports give the cost per mile of road as the unit, regardless of the width of finished highway or the amount of work other than road surface proper, such as grading, culverts and other drainage; in some cases, even long expensive bridges are averaged in the cost per mile. In addition to this, the material used in a very large percentage of state highways is broken stone or gravel, either alone or combined with relatively small amounts of other materials as binders, and the proximity of quarries or gravel banks to the road in question is a very important element in the cost of the road. In some states the records do not even distinguish between different styles of roads, but give the average cost per mile of a mixture of macadam, brick and concrete pavement, for instance. In one set of records, oiled water bound macadam is shown to cost \$1.16 per square yard, while in

the same county brick is shown to cost \$7.22 per square yard, and nothing is stated to indicate what particular items have added approximately \$5 a square yard to a fair cost for the brick surface proper.

It seems to us that, in view of the millions which are being spent in road improvement and the great amount of interest which is being taken by every state and county in the work which is being done by others, there should be an immediate and pronounced reformation in the method of keeping and publishing accounts of road construction. Some officials use the mile of road per foot width as a unit, and this is equally as definite as the square yard and is in many ways more convenient for use, since the average taxpayer can probably reckon the cost of an improvement more readily with the mile-foot unit than with the square yard. For comparison of costs between different localities, there should be a subdivision of the total cost into labor, materials (itemizing each class), grading and additional expenses such as culverts, bridges, guard fences, etc. A statement that construction of a macadam road 8 inches thick in a certain county cost say \$125 a foot-mile for labor, \$200 for stone, \$62 for grading and \$40 for culverts and all other structures, with a general statement of the cost of labor per day and stone per ton or cubic yard, would permit a fairly definite and informative comparison of costs with work done in other counties, and would be of much greater value in estimating future costs of similar work in the same county.

But even more important than the keeping of records so as to furnish comparable unit construction costs, is the keeping of maintenance records in such a way as to make possible the calculation at any time of the total cost to date of any given stretch of road. Several states have built experimental roads, so-called, in which a number of different kinds of material and methods of construction are employed in laying consecutive short stretches of road on a public highway, and noting the effect on each of the traffic to which all are subjected; but as a matter of fact, every state road should be an experimental road, in the sense that experience with it is utilized to determine its desirability and ultimate cost as compared with other kinds of construction or traffic conditions, and the only thing needed to make this possible is the keeping of properly classified records. Among the bills introduced in the Ohio Legislature is one which provides that every state aid road constructed be divided into sections one mile long, each section being designated by a number or otherwise, and that the records of the commissioners or others in charge shall be so kept as to show a complete history of each mile section of road—the date and method of its construction, cost per square yard of constructing road surface proper, and the kind, amount and cost of each item of repair or other maintenance work done upon the road. Thus, when a given section of road is worn out, its ultimate cost will be known, and a comparison of such costs will indicate what kind of construction has proved the most economical.

Until some method of keeping the records of each stretch of road of a given kind of construction is kept by our road authorities, neither they or anyone else can tell whether or not they are squandering the public funds by continuing to construct roads which their records should have shown them were less economical than others equally acceptable to traffic. A state which spends one million dollars, five million or ten million per year on road construction and maintenance might, it is easily conceivable, save 25 per cent of the ultimate cost of its roads by selecting a more economical construction which would be equally acceptable to traffic, if only they had the records requisite to the determination of what such

construction might be. And it does not appear why the cost of keeping such records should require more than the services of a bookkeeper at a salary of say \$2,000, since it is presumed that all of the figures and other data required are already in the possession of the engineers or superintendents in immediate charge of the work, and could readily be sent by them to the main office at no additional expense, and little, if any, additional labor on their part.

Over \$100,000,000 a year is spent in the construction of state aid roads and other millions on roads not so aided, and yet the taxpayers are not informed, and cannot in any way find out, whether this money is being spent in economical construction, or whether the roads built by it are of the kind which will give the fullest returns for the money expended. And even worse than this, there are very few states, we believe, in which the state officials themselves have any facts upon which to base a judgment as to the latter point. It is inconceivable that the people will much longer permit this enormous expenditure to continue without demanding some definite and informative accounting for the same, as well as more intelligence displayed in selecting the classes of road to be built by it.

MINNESOTA'S NEW ROAD LAW.

A new road law for the State of Minnesota was signed by the governor on April 15 of this year, and went into force immediately, which embodies many of the recent approved ideas which are found to be lacking in the road laws of most of the states. Some of the more important features of this law are briefly abstracted here-with.

The roads of the state are divided into three classes—state roads, county roads and town roads. The first are to be constructed, improved and maintained by the counties under rules and regulations of the State Highway Commission. The Commission consists of three commissioners, not more than two of which can belong to the same political party, and which serve without compensation. This commission is a continuation of that already provided for by laws of 1905 and 1911.

One hundred and fifty thousand dollars a year is appropriated for the expenses of the commission, including the salary and expenses of the state engineer and his assistants. Not less than one or more than three per cent of the state road and bridge fund available in any year shall be apportioned to any one county. Twenty per cent of the allotment so made to any county must be used for maintenance of state roads and the bridges thereon, and the county commissioners must provide for the proper maintenance of these roads in accordance with the regulations of the highway commission. After deducting the maintenance costs, not to exceed 25 per cent of the remaining apportionment may be expended on county roads. In determining the amount to be paid out of the state appropriation to any county as state aid, the proportion of the total cost of the roads which shall be paid the county shall be 80 per cent, where the assessed value of the property in the county for taxation purposes is less than \$5,000,000, 70 per cent where such value is between \$5,000,000 and \$10,000,000, 60 per cent where it is between \$10,000,000 and \$15,000,000, and 50 per cent where it exceeds \$15,000,000; it being provided, however, that in no case shall the total payment to a county exceed the allotment for the year, less the amount required to be spent in maintenance as above stated.

County boards may designate any established road not within the limits of a borough, village or city as a state road, with the consent of the highway commission. Should an application to have a given road declared a

state road be made by at least ten freeholders of a county, and the county commissioners refuse to grant this application, the highway commission may itself make such designation should it think it desirable. The council of any village or city of the fourth class may, with the consent of the commission, designate any street or road within its limits which is at least 60 feet wide as a state road, if it serves as a direct connecting link with parts of a state road leading from opposite sides of the village or city; payment for such road being taken from the state appropriation for that county, but not to exceed one-half the cost of the road, or in any event \$1,500 per mile.

A separate county fund is provided for known as the "Dragging Fund," which shall not exceed one mill on the dollar, which shall be spent by the town boards for dragging the roads of the town under contract not to exceed \$1 per mile for each time a road is dragged. No county, town, village or city of the fourth class shall contract for the erection of a bridge or construction or improvement of a road for a larger amount than \$500, without filing plans and specifications and advertising the letting for at least three weeks.

Provision is made for macadamizing or placing other improved surface upon an established highway in any town by submitting the same to vote upon the petition of fifteen or more voters and real estate owners, such vote to be held at the next annual meeting or at a special town meeting, 60 per cent of the vote cast being required; town bonds to be issued to cover the cost, interest not to exceed 6 per cent, payable in ten equal annual installments beginning eighteen months from date.

The law fixes the third Tuesday of June in each year as "Good Roads Day," and the governor shall annually, on or before the first day of June, by public proclamation, request the people of the state to contribute labor, material or money toward the improvement of public highways in their respective communities, upon that day."

QUEENSBORO MAINTENANCE WORK.

(Continued from page 624).

Under the same department but another division, in Far Rockaway, Sheridan avenue is being resurfaced with plain macadam. This street is not a main thoroughfare, but is an important side street. It goes to show that plain macadam has not yet gone out of use, even on streets having a fair amount of travel. However, near the seashore, the air is moist and the roadway not as dry as in inland places, hence less inclined to ravel. Moreover, the surface may be treated with asphaltic oil or some other dust layer later in the season. In this connection it is interesting to note that the bureau is purchasing this year some high class spraying and other road machinery, with a view to doing extensive work and keeping their costs low. Sheridan avenue had a macadam roadway which was pretty well worn out. The old surface was broken up with a heavy scarifier recently purchased by the bureau from the Port Huron Engine and Thresher Company. The foreman in charge stated that the weight of this machine was a great advantage and that it rode much more smoothly than a lighter machine. After scarifying, the roadway was brought to grade with a road machine. About three inches of 1½-inch broken stone are spread and rolled with a Monarch roller. A very light sprinkling of sharp sand is spread over this, not more than a small shovelful to the square yard. Then the screenings are spread about an inch deep. A sprinkling wagon, with the valves wide open, is run over the roadway three or four times and the final rolling then given.

NEWS of the MUNICIPALITIES

Current Subjects of General
Interest Under Consideration

by City Governments
and Department Heads

ROADS AND PAVEMENTS

Order Tile Letters for Street Corners.

Corpus Christi, Tex.—Mayor Miller has authorized Engineer Stevens to place an order for tile letters which will be placed on the street corners in the cement paving. The letters are blue on white base and are similar to those used in all of the larger cities of the state. Contractors placing cement sidewalks will be furnished the letters free of charge and will be required to place the letters on all of the walks. Engineer Stevens has just placed in his office a cement testing machine which will be used to test the durability of all cement used in street construction.

Would Continue to Use Prisoners in Road Work.

Albany, N. Y.—That the plan of working state prisoners for highway improvement be continued upon a larger scale another year, and that prisoners so employed be placed "more upon their honor," with better rations and the privilege to use crockery instead of metal dishes as a partial reward for faithful service are among the recommendations made to the legislature in the annual report of the committee on industries of the state commission of prisons.

City Improvements at Anderson Since Last August.

Anderson, S. C.—According to a report submitted to City Council by J. H. Godfrey, city clerk and treasurer, approximately \$32,000 has been spent for permanent improvements on the streets of the city since August 15 last, the money for same being appropriated out of the current expense fund. The following improvements are noted: Sewerage construction, 27,268 linear feet, costing \$15,775; sidewalk paving, 5,723 square yards, costing \$5,435; cement drains laid, 2,655 square yards, costing \$2,100; stone curbing, 8,023 linear feet, costing \$3,210. The remaining improvements were in the nature of new stock, equipment, and to buildings. During this term the Council has established seventeen water hydrants and eight arc lights.

Road Construction Delayed.

East Orange, N. J.—Failure to secure desired legislation has led the road committee of the East Orange City Council to abandon the idea, temporarily at least, of putting a new surface on Washington and Harrison streets. The proposition was to bond the city and raise about \$90,000 for the two thoroughfares. They were selected as main arteries of travel and subjected to the heaviest traffic. Their improvement was to be the first step in a large project, which involved a total estimated expenditure of \$300,000. The immediate cause for the change of purpose is that the city was unable to have passed at the late session of the legislature a law enabling it to enforce regulations as to pipe connections in the street. It was deemed necessary to prevent opening the surface of the street after it was laid, and to do so connecting pipes to the curb line would have to be laid. Under the charter the powers of the city in that direction are now limited.

Eliminating Curves on State Road.

Lowell, Mass.—Work on the state highway between Lowell and Lawrence by way of First street is progressing rapidly, and already the men in charge have completed the rough grading. A section of the proposed boulevard is illustrated, showing a curve in the road that is to be straightened. It was rumored recently that on account of the new bill presented by Colonel Sohier, which calls for an appropriation of \$30,000 to complete the road, that unless that bill was passed work would be stopped on the construction of the road. This is not so, however. The

men are still at work and they will complete the road. When the estimates for the road were presented last winter the engineers did not figure on the trouble which was liable to come on account of drainage and other work which they have discovered since, and now about \$30,000 more than



Courtesy Lowell "Sun."

CURVE IN LINE OF PROPOSED BOULEVARD.

the appropriation will be needed to complete the work. A retaining wall which was constructed by the county commissioners will have to be removed, sharp curves will be cut through, the electric car tracks will also have to be shifted and the surface grade on the road will be laid from the Lowell line to Lawrence, and all this means great expense, and it was for this purpose that Colonel Sohier, chairman of the highway commissioners, introduced a bill for \$30,000.

Repair Gouged Out Pavement.

Rochester, N. Y.—Employees of the Department of Public Works have begun to repair the asphalt pavement in Culver road, near Blossom road, where the big water main broke on March 7. Investigation showed that the concrete foundations of the road had been washed away and undermined for a distance of about 100 feet, and that it will be necessary to rebuild the foundation. The water main broke about noon on March 7, at the time when there was a heavy fall of snow on the ground, and before the water could be shut off, it had run across University avenue into the Culver road subway to a depth of about seven feet, effectively blocking traffic through the subway. Damage to the amount of several thousand dollars was done to plants in the vicinity which were compelled to close down for a short time.

Road Commission to Do Work Itself.

Baltimore, Md.—A motor truck has been purchased by the state roads commission and the commission is now ready to take into its own hands some of the work that has been given out by contract or at so much per day. The new truck cost \$4,500 and weighs five tons. It can also carry five tons of cargo. The first work of the truck will be to haul fine stone or gravel along the state roads to be placed on the surface after the annual oiling has been done. The oiling process is considered the most important in the preservation of macadam roads. Heretofore it has been done by contract, either through road builders or through big concerns like the Standard Oil Company or the United Gas Improvement Company of Philadelphia. The commission figures that it can do the work at less cost by

using its own truck, which is equipped with machinery to properly handle the oil. It is estimated that the one truck will oil four miles of road a day. The commissioners think that the truck is not too heavy for use on the roads. There is a movement on foot to have the next Legislature enact legislation that will limit the weight of trucks and cargoes. The heavy trucks, reports from other states say, are tearing up the new roads, and it is realized that something will have to be done to protect the highways.

New Road Law for Knox County Now Effective.

Knoxville, Tenn.—The new road law passed by the legislature is now effective in Knox county. The measure was drafted by a special committee of the county court and members of the road commission. It has several new features. Among them are these: Elect members of commission for six years; place the cart system upon all pikes that have been repaired; election of county engineer by road commission; providing for a penalty for non-payment of \$3 road tax; placing all convicts on repairing pikes. W. R. Hatcher, clerk of the road commission, has received a certified copy of the law.

State to Take Over Highways in Morris.

Morristown, N. J.—Deputy Road Commissioner E. M. Vail arranged for the survey and taking over by the state of the so-called "blue" roads. These are the main thoroughfares, linking up sizable centers of population, which the state intends to have improved as a part of an extensive system of principal lines of vehicle traffic. They are called "blue" roads, because in the published road surveys of the state setting forth a proposed comprehensive system of state roads those first to be taken over by the state are printed in blue. Mr. Vail said the law had been passed and signed rather unexpectedly and a general move is being made to care for the roads which immediately become state roads. The "blue" roads in Morris county begin at the Passaic river bridge at Chatham and run through Chatham and Madison to Morristown. Here the main line diverges from the main county road, leaving Morristown over Sussex avenue and running by Mt. Freedom to Succasunna and on to Netcong. The second road is the main highway between here and Bernardsville, and thence to Somerville. The "green" roads, which, under the plan, will be the next to be taken up, run from here through New Vernon and Stirling to Plainfield and from there through Morris Plains, Littleton and Parsippany to a Paterson connection.

Resurface Lake Avenue.

Fort Wayne, Ind.—The Grace Construction Company have put a gang of men at work clearing up Lake avenue in preparation for the resurfacing work, which the Barber company has ordered done there. The street was torn up by the recent floods, and, although the Barber company's guaranty does not cover such conditions, the construction people ordered the Grace company to put the street back in good condition and render a bill to the Barber company. The resurfacing work on Cass street will be started by the Grace company and the Moellering Construction Company already has a gang of men on the paving of Maumee avenue from Warren to Sidney street. The next job this company will start will be the paving of Maumee from Harmer to Walton.

Colorado Establishes Road Building System.

Colorado Springs, Colo.—Colorado has done away with the old "pork-barrel" methods of expending state road funds. Its legislature has just enacted two laws, the passage of which has been strongly advocated by good road enthusiasts, commercial associations and the business and motor interests of the state for several years. An active campaign in behalf of these measures has been made by the Colorado Good Roads Association. One of these bills creates a state highway commissioner with an advisory board representing the five sections of the state, to have general supervision of state roads. The second bill places the internal improvement fund in the hands of the Highway

Commission for the expenditure on a comprehensive system of roads. This fund now amounts to about \$750,000. It is provided that the commission shall appropriate sums equal to those of the respective counties for work on state primary roads, but it has power to increase this as high as \$5 to every \$1 in counties having low valuation and expensive road construction. Consequently there will be available for road development this year between \$1,500,000 and \$2,000,000 to be spent on connected roads.

Will Extend Continental Road.

Wimbledon, N. D.—Grading outfits and contractors with crews of men have arrived in Wimbledon to begin work on the Midland Continental on the extension north of Jamestown toward the international boundary line. The road was started at Edgeley and constructed to Jamestown. This year it will be built north through this state and next season it will be constructed from Edgeley south through South Dakota. It is intended to make the line a connecting link between Winnipeg and the Gulf of Mexico.

Railroad Increases Freight Rate on Crushed Stone.

Baltimore, Md.—Notice by the Pennsylvania Railroad Company to the effect that freight rates on crushed stone to points on the eastern shore will be increased 45 cents a ton on June 1 has been sent to the State Roads Commission. When the state road work was begun one of the problems was the high freight rate to eastern shore points. There is no stone over there with which to build roads. The Pennsylvania, which dominates the transportation field on the shore, was appealed to and finally the company's officials decided to yield to the state's plea and fix a rate that would permit road building to go on at a cost within limit. Now it is to be increased 45 cents a ton to the old rate and this means an increase of \$1,000 to \$1,800 a mile in stone road construction. The State Roads Commission, where it is doing work direct, is now getting its stone hurried to the points where it is needed to escape the high rate, but the contractors who have taken work may be caught and forced to the wall. The Public Service Commission will be asked to prohibit the new rate wherein it affects interstate points alone.

Two Counties Accept Money for Highways.

Denver, Colo.—The first two counties to accept the terms of the new highway commission law by which counties are to give one dollar for every dollar appropriated by the highway commission for road building, are Boulder and Rio Grande. The former county is to get through the apportionment \$8,000 and the latter \$6,750. This agreement means that Boulder will at once have \$16,000 and Rio Grande \$13,500 to use in improving highways. Commissioner Ehrhart said that he was anxious for all county commissioners to act upon the propositions submitted to them by the highway commission in apportioning the \$318,000 of the available fund of \$580,000. On May 5 the advisory board will assemble in Denver to complete the distribution of the remaining \$262,000. When this has been done the total available sum for road work will be the entire amount of \$580,000.

Expect to Complete 500 Miles of Road This Year.

Baltimore, Md.—If the calculations of the State Roads Commission do not prove wrong the end of the present year will see not less than 500 miles of the state roads system completed, which will be about one-half of the mileage in the original plan to connect the various county seats and principal towns in the counties. Just now the contractors are getting to work for the season, some on work that was partly completed last fall and many others on contracts let this year. On March 1 just past the records of the commission showed that 314.31 miles had been completed and paid for. There are now under contract many sections of road in the various counties, with an aggregate mileage of 106.59, while there are many contracts yet to be let. It is the calculation of the commission that with the early start already made there will be built this year 204.50 miles of road, and this will bring the total

mileage above 500. If as much as 200 miles can be completed this year the board will make a high record for such work, as it has taken four years to complete the 314 miles now accepted. The total expenditure of the State Roads Commission up to March 1 last was \$5,169,673.33.

Building Hamilton Creek Road.

Stevenson, Wash.—The Sweeney Construction Company of Portland has established a camp for 150 men back of Castle Rock and is beginning the work of building the Hamilton Creek road, having a contract for nine miles. The road is to be completed this summer.

Start Work on County's First Concrete Road.

St. Petersburg, Fla.—The first concrete road ever built in Pinellas county will be put down by Snell & Hamlett to make a test of this material for roads. The contractor will lay several blocks of the concrete road, beginning at Thirteenth avenue and being a continuation of Beach drive north. The road will be sixty feet wide.

May Recut Old Stone Blocks.

Baltimore, Md.—As the result of an inspection of the paving methods in New York and Philadelphia by Chairman Compton of the Paving Commission, a plan may be adopted in Baltimore whereby old Belgian blocks will be recut and converted into blocks equal to new. This plan is in vogue in Philadelphia, and, according to the head of the Paving Commission, a great amount of money is saved each year by its use. The old block is cut in half and then relaid with the new surface caused by the bisecting process turned upward. Practically a new stone is formed by this method.

Petition Governor to Have Road Plans Changed.

Cuba, N. Y.—A petition addressed to Governor Sulzer is being circulated along the route of the proposed Cuba-Friendship-Belmont state road asking him to have the plans for the proposed road changed from a twelve-foot width to one of sixteen. Inasmuch as this is a part of route No. 4, which runs from Jersey City to Chautauqua lake at a uniform width of sixteen feet, and is one of the hardest traveled in the county, the petitioners feel that this change in plans is due them.

Gold Medal for Composition on Roads.

Washington, D. C.—A gold medal to the school boy or girl between the ages of 10 and 15 who writes the best composition, not to exceed 800 words, on the repair and maintenance of earth roads, is to be awarded by Logan Waller Page, director, Office of Public Roads, United States Department of Agriculture, Washington, D. C. All compositions must be submitted to Mr. Page before May 5, 1913, and the medal will be awarded as soon thereafter as the compositions can be graded. The composition may be based on knowledge gained from books or other sources, but no quotations should be made.

SEWERAGE AND SANITATION

City to "Swat the Fly."

Williamsport, Pa.—Plans for a city-wide "swat-the-fly" campaign have been made by the Lycoming County Society for the Prevention of Tuberculosis, working in conjunction with the Superintendent of City Schools. Moving picture theatres will also co-operate in the campaign by showing films depicting the flies' deadly work.

House for State Aid in Sewage Plants.

Harrisburg, Pa.—A bill carrying \$1,000,000 for state aid for municipalities, compelled by the state health department to construct sewage disposal plants, passed the House by a vote of 153 to 10. The passage of the bill followed a colloquy between S. Taylor North, Jefferson county, and John R. K. Scott, Philadelphia, in which North declared that it would require \$20,000,000 to carry out the

provisions of the bill if it is applied by other legislatures to the 269 cities and boroughs already ordered to cease stream pollution. Still other municipalities will receive similar orders.

Quick Work in Sewer Building.

Knoxville, Tenn.—About 1,500 feet of the Third Creek sewer ditch has been dug and 300 feet of the sewer laid. The work is being done more rapidly than usual, as steel forms are being used in laying the concrete, instead of wooden forms. The sewer is being constructed oval shaped and the top is covered with cement, thus making it water proof. The crew is now at work south of Cumberland avenue. This sewer will drain all of the territory west of Ninth street in the tenth ward.

Regulations Concerning Canned Goods in Bakeries.

New York, N. Y.—At a meeting of the Board of Health of the Department of Health held April 8, 1913, it was decided that, upon approval by the Sanitary Superintendent in each case, the secretary should issue to bakers permits allowing them to return condemned canned goods to the wholesalers and thus obtain the rebate to which they are entitled. This action of the board was merely an extension of a privilege which has for some time past been granted to grocers. The action of the board was taken upon a report of the Sanitary Superintendent, which reads as follows:

At the present time an arrangement exists whereby grocers may return condemned goods to the wholesalers from whom they were purchased in order that rebates may be obtained and financial loss prevented. The Department of Health has never considered it proper to permit this practice in the case of bakers, but recently numerous applications have been received from bakers and bakers' supply houses requesting that a similar privilege be accorded them. I would recommend that this privilege be extended to bakers and bakers' supply houses provided the following conditions are complied with: 1. In each bakeshop there shall be a barrel, box or bin, suitably covered, upon which or over which shall be placed a sign reading as follows: "The contents of this barrel, box or bin are unfit for human consumption, are not to be used as such and are to be returned to the persons from whom purchased, for condemnation by the Department of Health." 2. Immediately upon opening a case of canned goods, every can in the case must be inspected by the proprietor of the bakeshop or one of his agents, and all swelled cans shall be placed in the receptacle provided. 3. The proprietor of the bakeshop must notify immediately the persons from whom he purchased the goods, of the presence of any material for condemnation. This notice may be served upon the salesman of the house, or may be made in writing through the mail. 4. If any "swells" are found in any bakeshop elsewhere than in the receptacle provided for under section 1, it shall be construed that these goods were to be used in the manufacture of foodstuffs, and therefore, action shall be taken against the proprietor of the bakery for having such material in his possession.

WATER SUPPLY

Water Is Treated With Chemicals.

Richmond, Ind.—Howard A. Dill, superintendent of the Water Works Company, took samples of the city water from the reservoir, the different galleries and different faucets to Indianapolis to be tested. The supposed sources of the infection were treated with hydrochloride of lime and the Water Works Company hopes to have the water entirely free from danger within a few days at the latest.

Model Shows Water System of Syracuse.

Syracuse, N. Y.—A sectional view of the earth between Skaneateles lake and the reservoir of the city's waterworks system and a contour of the intervening country are shown in an interesting model prepared for the exhibit of the Syracuse Water Bureau at the Industrial Show. The model, which is of papier mache on a framework of wood and wire, was made under the direction of Prof. Charles B. Walker of the College of Fine Arts, Syracuse University. Its dimensions are 9 by 3 feet, with a depth of 2½ feet. The hills and valleys occupying the nineteen miles of territory between the lake and reservoir are depicted with official topographical exactness. The miniature reservoir at the lower end of the model is filled with water. The sectional view shows the two conduit lines of the water system. Here the point that because of the rolling character of the county the great pipes carry the water uphill at many places, is impressively brought out. While the gravity system is made possible by the fact that the

reservoir is 230 feet lower than Skaneateles lake, and by a further fall of about the same degree to the level of the Erie canal, the "up" and "downs" of the conduit lines above the reservoir indicate the impracticability of using Skaneateles water for power purposes. This is regarded as the peculiarly important educational feature of the model. A water meter in operation, a sanitary drinking fountain for exposition visitors and maps of the water system will be included in the Water Bureau's display. Superintendent George A. Glynn has also arranged for the distribution of a booklet entitled "Syracuse's Best Asset," bringing out in comprehensive fashion the importance of the taxpayers' investment in the waterworks.

New Water System Accepted.

Muncie, Ind.—The official test of the new municipal-owned water system of Normal City was made in the presence of the board of trustees. After the members of the board had witnessed the tests the system was accepted as satisfactory. The new hose and reels recently purchased by the town were used. The pumps gave such a pressure that water was thrown over the Muncie Normal Institute Building, the highest building in Normal City.

Chemicals to Purify City Water.

Philadelphia, Pa.—Permanent apparatus for mixing hypochlorite of lime or liquid chlorine with the filtered water is to be installed at each of the filtration plants. This treatment of the water has been found necessary for killing the germs which, when the river water is highly infected, escape the sand filters. It is probable that the city will adopt the liquid chlorine system of treatment. The operation is said to be more economical than the crude method of putting chloride of lime in the water.

City Saves \$40,000 on Pipe Line Unit.

Tacoma, Wash.—With the cost of the third unit of the Green River pipe line computed and checked, it was said by Commissioner Nicholas Lawson that if the entire pipe from the headworks to the city had been built as was the third unit—by day labor—the city could have been saved \$300,000. A saving of \$40,000 from the original estimate was made by Project Engineer J. C. Manley in the third unit, just finished, while both of the other units, built by contract, cost more than the original engineer's estimate. "We could have saved \$300,000 and had a much better pipe line clear from the headworks if the work had been done by the city on day labor basis," said Lawson. "I never saw a finer pipe in my life than that placed in the third unit. We have had to bolster up the pipe built by private contract in a number of places, and the cost was greatly in excess of what it should have been. After careful figuring, we originally estimated the cost of the third unit at \$141,000. It will cost us just about an even \$100,000, and we will get a better pipe than was ever laid in Tacoma."

Municipal Machine Shop Saves Money.

Salt Lake City, Utah.—A modern machine shop, which the superintendent of waterworks estimates will save the city about \$1,000 a year in cost of material and apparatus for the water department, has been installed at the workshop and stables in City Creek Canyon, and is now in operation. The new shop was inspected by the Commissioner of Waterworks, Superintendent C. F. Barrett, William Bowen, of the Commercial Club Water Committee and newspaper men. Modern lathes, turning machines and other machinery necessary for an up-to-date machine shop have been installed and placed in charge of an expert machinist and his helpers. Although the shop has been in operation only a short time and all the machines have but recently been installed, it has been found that the machinists can turn out castings, valve stems and such apparatus for less than half the market cost.

Superintendent Reports on Value of Meters.

Holyoke, Mass.—The receipts of the water department have amounted to more than \$60,000 for the past year, according to the twentieth annual report of the water department. The report of the superintendent urges the extended use of the meter service, being in part as follows: "That the consumption of water can be decreased by the

installation of meters is evidenced by the fact that out of 2,516 taps on our high pressure system there are 1,015 meters. Fifteen of this number are large manufacturing concerns who used 102,000,000 gallons of water the past year, with a revenue of \$9,890.16. This leaves about 1,000 meters with an average consumption of 215,000,000 gallons per year. Forty per cent. of our system is metered and shows a consumption of 105,000,000 gallons less than the 60 per cent. which are on the flat rate with a yearly revenue of \$24,000."

Connect City Wells With New Pumping Station.

Biloxi, Miss.—Howard Greer, of the Cooper-Greer Company of Gulfport, is connecting all the city artesian wells with the new pumping station and reservoir put in by the city as part of the new \$70,000 water works extension system. Mr. Greer states that he has about two months' work to do, which will be the last of the work of extending and improving the system. The materials have been on the ground for about two months, but work was delayed by bad weather.

Water Tests Show Purity.

Fargo, N. D.—The results shown by tests of the water at the filtration plant during the breaking up of ice in the river and during the high water show that the plant is the most efficient in the country, according to a statement made by City Engineer Anders. "The efficiency of the Fargo plant was shown during the high water. Before the break-up of the ice the bacteria control showed a count of 3,000 bacteria per cubic centimeter. After the ice began to go out the count ran as high as 85,000 per cubic centimeter, but at no time did the number of bacteria in the filtered water exceed 100 per cubic centimeter and in most of the cases the count was between 8 to 20 per centimeter, making the efficiency of the plant almost 100 per cent."

Question of Cities Owning Competing Waterworks.

Washington, D. C.—Whether cities having the power to regulate the rates of private-owned waterworks may themselves install competing municipal-owned waterworks was argued before the supreme court of the United States in a case arising out of waterworks in Madera, Cal. Attorneys for the Madera waterworks presented the contention that to allow the city of Madera to complete its own waterworks would be to give it the power to furnish water below cost and compel the private-owned plant to do likewise, thus taking its property without compensation. Attorneys for the city argued it would be time enough to raise such a point when the city reduced the rates.

Lafayette Strikes Water for City Use.

Lafayette, Ore.—Contractor George E. Scott, of Portland, has completed drilling the well for Lafayette's water supply system. The depth of the well is 243 feet and the depth of the water is 200 feet. A test pump running for over three hours showed a capacity of 110 gallons a minute through a five-inch pipe. Mr. Scott is confident that a supply of water is there, sufficient for any and all demands of the city. The water is clear and of good quality. The City Council has accepted the well and the work of putting in the entire system will be started as soon as arrangements can be made.

High-Pressure Main Safeguards Hill Section.

Syracuse, N. Y.—The Bureau of Water is laying a high-pressure main from Cortland avenue, in Elmwood, through West and East Lafayette avenues to East Brighton avenue. This will give two sources of supply to the high pressure district on University Hill. This will be one of the most important additions this year to the distributing system. At present the high pressure service mains extend from the standpipe to the high grounds at Elmwood and from the standpipe through Castle street to the university district. In case of a break in the latter main, as was the case last year, the supply of water to the high points about the university would be cut off. The new main being laid connects with that at Elmwood and will be extended to Comstock avenue when that street is continued to the south, so that if one of the two mains gets into trouble the other can be relied upon. The main is being put down

now, as Lafayette avenue is to be paved this season. No local service is given along the line of the high-pressure main, as there are other pipes in the street for that purpose. During the season about two miles of new mains will be laid to supply districts that are being built up. The iron pipe for the purpose has been purchased and the work is under way.

STREET LIGHTING AND POWER

New Bulbs Save the City \$1,000 a Year.

Perth Amboy, N. J.—By the installation of Mazda lamps in place of the old style fibre incandescent bulbs City Electrician Jay B. Franke is saving the city nearly \$1,000 a year. In two months alone, with not all municipal buildings equipped with Mazda lamps, the light bills for public buildings was decreased \$154.63. The city electrician had secured \$80 worth of the new bulbs and placed them in fire houses and the police station. The monthly reduction, as a result, ranged from \$8 to \$27 a house. Since the time of the purchase of the first lot of Mazda lamps the price has been reduced about 50 per cent. Fire houses and the police station were equipped with them in March of 1912. The comparisons were taken for January and February of 1912 and this year.

Municipal Gas Plant.

Palo Alto, Calif.—The City Council has adopted resolutions favoring the acquisition of a municipal gas manufacturing and distributing plant. The resolution requests the city engineer, the board of public works and the city attorney to inform the council as to the length of time and method of procedure necessary to issue bonds for this purpose. These resolutions, which passed unanimously, are the outgrowth of a long-standing controversy between the city and the local gas company, the matter finally being carried to the state railroad commission.

Electrical Department to Experiment with Street Lighting.

Washington, D. C.—An experiment in illumination which may determine the character of lighting to be provided for streets in the downtown section of Washington will be conducted by the District of Columbia Electrical Department. Arc lamps of 1,000 candlepower will be installed on G street between 13th and 14th streets northwest, and a test made as to whether lamps of this size are practical for lighting the business portions of the city. If the department is satisfied with the results obtained, it will consider plans for providing this character of illumination for F, G and a number of other business thoroughfares. The new lighting system planned for Pennsylvania avenue between the Peace monument and the Treasury Building probably will be installed by October 1, according to announcement. The present 800-candlepower lamps on this street will be replaced with arc lamps of 1,500-candlepower, established at distances of 100 feet apart on each side of the avenue.

Removal of "Dead" Gas Lamps Expensive.

Providence, R. I.—According to members of the City Council who are in a position to know, the city is facing the necessity of expending at least \$16,000 if the nearly 3,000 "dead" gas lamp posts now obstructing local sidewalks are to be removed. When the city discontinued the use of gas for street lighting purposes a few months ago there were about 3,000 of the lamp posts left standing. This number has since been reduced to 2,717, and it is estimated that it will cost more than \$16,000 to remove them. Of the 2,717 posts still standing, 2,400 of them are said to be connected with the gas mains, while the remaining 317 are disconnected. To remove the posts which are disconnected will cost about \$2 each, or approximately \$625. To remove the posts which are still connected with the gas mains, however, a much heavier expense is necessary. Those who are in a position to know say that the Providence Gas Company charges the city about \$4.50 for disconnecting a lamp post, on the ground

that it costs them that sum to make the necessary excavations and to disconnect the post from the main. This charge of \$4.50, added to the actual cost of \$2 for the removal of the post itself, brings the total cost for the removal of one connected post up to \$6.50. There are 2,400 such posts in the city, it is said, in which case it would cost \$15,600 to remove them. This, added to the \$625 for the removal of disconnected posts, would bring the total expenditure for the work up to something over \$16,000. Whether or not the city is willing to stand this expense, and whether or not the Providence Gas Company is warranted in charging \$4.50 for disconnecting a post, are the questions which are bothering the lighting committee at present.

FIRE AND POLICE

Fire Prevention Day May 2.

Madison, Wis.—State Fire Marshal T. M. Purtell has sent out bulletins announcing that May 2 has been designated Fire Prevention Day, and that the Governor has issued a proclamation calling upon the people of the state to observe it. Mr. Purtell requests the Mayors of the various cities of the state to make similar proclamations. He also urges citizens to clean up possible sources of conflagrations and chiefs of Fire Departments to make inspections of buildings. He asks that teachers of the public schools give lesson talks on the dangers of fire and methods of its prevention.

Red Light for Fire Calls.

Sioux Falls, S. Dak.—A flaming red ball at the top of the mast on the tower of the new fire station at Ninth street and Minnesota avenue, according to Commissioner of Fire and Police Dickenson, will indicate, in the future establishment of the department there, that the fire fighting equipment is rushing on its way to some other part of the city in answer to an alarm. When a call is received at the new headquarters, the light, which can be seen for a considerable distance from the station, will flash out its warning and continue to blaze until the department returns to the building.

Firemen's Class Given Diplomas.

New York, N. Y.—New York's first class of scientific fire-fighters have received their diplomas. The class was composed of fifty lieutenants of the Fire Department selected by Commissioner Johnson to put into effect his plan of having a school for firemen. The ablest battalion chiefs of the department were made instructors and the course required one year to complete. By special permission, two firemen from Trenton, N. J., were made members of the class.

To Hasten Fire Alarms.

Philadelphia, Pa.—Chief Pike, of the Electrical Bureau, has announced that he had taken steps to facilitate the turning in of fire alarms, which hitherto have been delayed by placing the keys of the boxes in neighboring stores. He referred to the fact that in order to prevent false alarms all the boxes except those in the center of the city had been locked. To turn in an alarm it was necessary to get the key from a store or look up the policeman on the beat. "As I feel that it is vitally important to speed up in every way the transmission of a signal of fire," said the chief, "I am having keys placed in a large number of street fire alarm boxes, protected by a small glass door to be broken in case of fire. This, of course, makes easier the sending in of false alarms, but to counteract this I am sending to the householders in the vicinity of such boxes a letter explaining the importance to them of having the keys in the boxes, and asking their co-operation in preventing the sending of false alarms or detecting those who send them. Perhaps the most valuable aid in this matter can be rendered by the Boy Scouts, and, with the indorsement of Director Porter, steps are being taken to enlist such aid."

MOTOR VEHICLES

New Use for Autos.

Bamberg, Bavaria.—The Bavarian government has found a new use for the automobile employed by the Post Office Department, by means of which the danger of great conflagrations in the rural districts is minimized. If a big fire breaks out in any of the villages farther than ten miles from a city, the fire engines of the nearest city are attached to the postal automobiles and hauled at high speed to the point of danger. As only the larger German cities have motor fire departments, the assistance of the postal motor cars is invaluable to the surrounding villages. The first practical test of the plan was made in Bamberg. The village of Walsdorf asked the city for help and a small fire engine was fastened to the rear axle of the automobile. The run was made in thirty-four minutes, and the assistance rendered by this engine was of great value in extinguishing the fire.

New Fire-Fighting Apparatus Received.

Portland, Ore.—Three of the American LaFrance automobile chemical and hose wagons ordered from A. G. Long have arrived and will be put in service. One will be placed in engine company No. 23, at East Seventh and Stevens streets, another at First and Jefferson streets, and the third in Irvington. Apparatus from the first two companies will be transferred to Rose City Park and Montavilla, where new companies will be installed. The other automobile apparatus, including five combination chemical and hose wagons, an aerial truck and a gasoline pumping engine, which was ordered several weeks ago, has been shipped from the East and will arrive in the near future. As soon as this apparatus is ready for service it will be placed in the inside engine companies, where the streets all are hard surfaces, and the horse-drawn apparatus will be transferred to the new companies in the suburbs. One of the sets of auto apparatus will be placed on Portland Heights.

Morristown Engine Tests.

Morristown, N. J.—In a recent competition held between the auto pumping engine concerns at Morristown the Webb engine, a 600-gallon machine, was tried out with the La France engine, of 700 gallons capacity. The hydrant tests resulted as follows: Webb engine—One line of 1,000 feet, $1\frac{1}{2}$ -inch nozzle, pump pressure 300 pounds, nozzle pressure 80 pounds, gallons of water per minute 335. The American-La France had a pump pressure of 230, nozzle pressure of 60, and delivered 290 gallons. Webb engine—Two lines of 300 feet each, $1\frac{1}{2}$ and $1\frac{1}{4}$ -inch nozzles, pump pressure 180, nozzle pressures 95 and 92, gallons 806, over 200 more than the guarantee. With $1\frac{1}{4}$ and $1\frac{1}{2}$ -inch nozzles 907 gallons were pumped. The American-La France had 250 foot lines, 1 and $1\frac{1}{2}$ -inch nozzles and pumped 763 gallons. At the river the suction tests had the following results: Webb—Two lines of 300 feet each, $1\frac{1}{2}$ and $1\frac{1}{4}$ -inch nozzles, pump pressure 150, nozzle pressures 77 and 66, gallons 781. With $1\frac{1}{2}$ and $1\frac{1}{4}$ -inch nozzles, 875 gallons were delivered. The American-La France in this test pumped 709 gallons with 1 and $1\frac{1}{2}$ -inch nozzles. Webb—Two 100-feet lines, $1\frac{1}{2}$ and $1\frac{1}{4}$ -inch nozzles, pump pressure 105, nozzle pressures 68 and 40, gallons 958. The American-La France, using two $1\frac{1}{4}$ -inch nozzles, delivered 900 gallons.

Auto Equipment for Fire Department.

Atlantic City, N. J.—Chief Black recently visited Newark, New York and Springfield, Mass., and then went to Washington and Philadelphia and in each of those cities looked over the auto engines, which have been in use there for a considerable period. In New York Chief Black spent a day in looking over the stations already equipped with the auto engines and the training school for firemen. The chief is preparing a report to the Commissioners on the need of the auto engines. He will make special recommendations regarding the installation of the new style engines at the new California avenue fire station, which will be completed within the course of a few weeks. The chief

is of the opinion that all of the fire apparatus in the city should be placed on automobile basis as soon as possible and that the city should make the start by installing the first of the proposed new apparatus at the California avenue station. The estimated cost of transferring a steam fire engine now drawn by a team of horses into an automobile motor is roughly estimated at about \$4,000, and an approximately similar sum for placing an auto motor on the hook and ladder trucks.

Nott Steamer Truck Speedy.

Grand Rapids, Mich.—The motor truck steamer at No. 3 engine house, which is equipped with a Nott universal type engine, was tested out by Assistant Engineer Griffiths who drove the powerful machine up the Leonard street hill at the rate of eight miles an hour. Master mechanic Bettinghouse and Assistant Master Mechanic Hill superintended the test. The steamer has a capacity of 1,200 gallons per minute and will prove very valuable in reaching big fires. The Nott engine is the largest in service in Grand Rapids.

Recommends Purchase of Auto Fire Equipment.

Kalamazoo, Mich.—The annual report of Fire Chief Russell recently presented to the Mayor and City Council says that during the past year the city has been favored with very few fires of any great size and the loss has been comparatively small, but, the chief says, "we cannot count on such continued good fortune and should increase our fire-fighting equipment so all parts of the city can be protected, especially when there are two or more fires raging at the same time. With these facts in view and in answer to a popular demand for more protection, I would recommend that two automobile combination wagons complete, carrying 1,000 feet of $2\frac{1}{2}$ -inch hose, and a 40-gallon chemical tank be purchased at once. Other cities are changing their horse-driven apparatus for the motor-driven, and as we have some horses that are getting too old and crippled for much longer service which will require them to be disposed of soon I am asking for a tractor for the aerial truck. This truck has been in the engine house for five years and as yet has never been put in service. When we need it we have to send back after it with a steamer team and there being a great many high buildings in the city now this truck should be in service."

No Speeding for Auto Fire Truck.

Fort Dodge, Ia.—Word has been received that the big auto truck, which is a Pope-Hartford make, will be shipped from the factory probably by the first of May. The machine is now completed and is being put through a thousand-mile run around the factory drives to give it a test before shipping. The truck will be installed in the Central Fire Department station immediately upon its arrival. The powerful auto fire truck will be capable of developing great speed, but there will be no fast reckless driving to fires, according to Fire Chief Frank Trusty. "It is better to get to a fire a little slow than not get there at all," said the fire chief. "When a big auto truck like the one we are to have is driven in a reckless manner there is great danger for fear of tipping over when turning a corner. We want to get to the fires as quickly as possible, but we want to make certain that we are going to get there."

Automobile Patrol in Commission.

Louisville, Ky.—A new and improved automobile patrol will be added to the "fleet" of machines of the Police Department. This new car will give the department four automobile patrols and two touring cars and will be assigned to the central district. One of the present central district automobile patrols will supplant the horse-drawn vehicle now doing duty in the Seventh District. The remaining automobile patrol is assigned to the Highland sub-station. The new car has numerous improvements about the driver's seat, which is shut in on all sides like the cab of an engine. It has been pronounced the most complete and beautiful police machine in the United States. P. M. Androit & Sons, of Louisville, the makers, have se-

cured orders from other cities for four duplicates of the car. The Board of Public Safety has also opened negotiations with the Board of Public Works for the purchase of the Oldsmobile purchased for the use of Sewer Engineer Roy W. Burks. Mr. Burks was unable to get the service he desired out of the car. It has been loaned to Col. H. Watson Lindsey, chief of police, whose chauffeur has had unqualified success in making it run. The chief has recommended to the Board of Public Safety that the machine be purchased from the Board of Public Works which does not want it. Col. Lindsey says that his seven-passenger car is too large for his purposes and advises that it be assigned to the Sixth District.

Shows Great Saving in Motor Patrol Wagons.

New York, N. Y.—One of the most interesting documents ever made public, showing the economy of the automobile over horse-drawn vehicles, is the 1912 report of the Police Department of New York City, lately made for the city officials. According to the report, three motor-driven patrol wagons not only affected a saving of more than 50 per cent. over the former method of transporting prisoners and accomplishing other work of the department, but each showed a total economy of more than twice its original cost. The cars were three Garfords, made by the Garford Company, of Elyria, Ohio, fitted with special patrol bodies and put into commission at the beginning of 1912. In the year's service the three have showed a saving of \$19,532.60 in maintenance charges, or \$6,510.86 each. Because of the showing made by the cars Police Commissioner Waldo has ordered ten more from the R. & L. Company, local distributors, to be delivered within sixty days. The report shows that three cars displaced nine horse-driven patrol wagons and cut down the staff of patrolmen necessary for their operation by eighteen. The figures for 1911 and 1912 given in the report, and showing the saving effected in the latter year, follow:

1911.	
Boarding 21 horses at \$30 per month	\$7,560.00
Shoeing 21 horses at \$5.50 per month	1,386.00
Repairs to nine patrol wagons, \$35 year	315.00
Repairs to nine sets harness, \$5 year	45.00
Eighteen patrolmen's salaries at \$1,400 per year	25,200.00
Total	\$34,506.00
1912.	
Automobiles kept in station house	
Tires, 48 at \$37.50 each	\$1,778.40
Gasoline, oil and grease	595.00
Nine patrolmen's salaries at \$1,400 per year	12,600.00
Total	\$14,973.40

The report points out, in addition, that the saving of money is not the most important of the installation of the Garfords. It is stated that the auto patrols, because of their speed and ease of handling, are vastly more efficient than horse-driven vehicles, the time saved in reaching scenes of riot, strike or fire, scattered over the city's large area, being highly important.

GOVERNMENT AND FINANCE

Commission Form of Government Was Adopted in Orlando.

Orlando, Fla.—The proposition to adopt a commission form of government for city was carried by a majority of 2 votes.

Charlotte Defeats Commission Plan.

Charlotte, N. C.—Charlotte has defeated the commission form of government. Out of a registered vote of 3,362, 1,236 votes were cast for the measure, thus defeating the commission plan by 446 majority. A new aldermanic charter was also voted on but received but 127 votes.

Elk City Begins Campaign of Rigid Economy.

Elk City, Okla.—Probably no other city of the first class in the southwest is operated at so little expense as that outlined for the administration of the city government of Elk City for the coming year. At a recent meeting of the City Council an ordinance was adopted which cut the salaries of members of the Council, the Mayor, the City Attorney, the Police Judge, and the Street Commissioner to \$1 a year. The salaries of the City Clerk and City Marshal were cut to \$25 a month.

Claremore Adopts Commission Form.

Claremore, Okla.—One Socialist, a Progressive, two Republicans and three Democrats will draw up the new city charter of Claremore, the "radium water" town, which is the latest city in Oklahoma to adopt the commission form of government. Not a city in Oklahoma of 5,000 population and over now but is under the commission form. A proposition to go back to the aldermanic form was defeated at Enid by a vote of 5 to 1.

Want Accounting of Municipal News Funds.

Los Angeles, Cal.—To determine in what way the \$36,000 appropriation for the late Municipal News was expended during the life of that periodical, City Auditor John S. Myers has begun investigation. Although the appropriation of \$36,000 was supposed to have been sufficient to carry the municipal paper for a year, it was exhausted in less than eight months. Citizens of Los Angeles voted the News out of business in the recent charter election.

Defeats Commission Plan.

Edgewater, N. J.—The proposition to substitute government by commission in Edgewater for the present form was beaten by 81 votes. There were 252 votes against and 171 for in the two voting districts on the proposition. The total vote of the borough is about 550.

STREET CLEANING AND REFUSE DISPOSAL.

Oil for Water.

Dundee, N. Y.—A public meeting was held last week at the Harpending House to talk over the proposition of oiling the streets of the village this summer. The company applies the oil with an automobile sprinkler that has a pressure of 85 pounds to the square inch, thus forcing the oil into the road and keeping out the water. The company will not make a contract for less than 60,000 square yards of street to oil, which will cost \$720. This amount will allow more streets to be sprinkled than have ever been sprinkled with water.

"Clean-Up Week" Is Named by Mayor.

Philadelphia, Pa.—Mayor Blankenburg has issued a proclamation calling upon all citizens to join in the effort to make the "All-Philadelphia Clean-Up Week" a success. The date of clean-up week is April 28 to May 3. It is the desire of the administration to have the city thoroughly cleaned, not only the streets and alleys, but the houses and cellars, before the warm weather begins. The departments of Public Works, Safety, and Health are co-operating in this movement with the sectional business men's associations.

Street Cleaning to Be Costly.

Dayton, O.—Six hundred thousand dollars will be required to clean Dayton's streets, according to a report submitted to Gov. Cox. This sum does not include the cost of reconstructing public property damaged by the recent flood.

Restoration of City's Streets Will Cost \$175,000.

Hamilton, O.—It will cost between \$150 and \$200,000 to clean the streets of Hamilton and to put the city in as sanitary condition as possible under the circumstances, according to an estimate made by Health Officer Dr. A. L. Smedley, under whose supervision the work is being done. It will be over three months before the streets of the city are as clean as they were before the flood, and it will be a year before it will be possible to place all of the streets in as good condition as they were a month ago. It is costing \$1,000 a day to do this work. Immediately after Dr. Smedley took charge of the sanitary conditions in the city, Council issued bonds, or credit certificates, in the sum of \$20,000 and turned the money over to the Health Department to clean the streets. Two weeks later Council transferred \$22,000 from another fund to the health street cleaning fund. The work of cleaning the streets is being done by Service Director Holzberger, William N. Andrews of the Citizens Committee, Lou Wittman, Jim Moriarity, and others, but was ordered by the Board of Health to prevent an epidemic, and it was up to the Board of Health

to raise the money. In fact, no other board could have raised the money. The law says that when a city is threatened with an epidemic the Board of Health must declare that the city is so threatened and take the steps necessary, if possible, to prevent such an epidemic, and, if money is needed, Council must provide the necessary funds without question. About seventeen days have been consumed in taking mud from the principal thoroughfares of the city and there has hardly been a dent made in the millions of tons that now litter every street in the city. It is doubtful if even three months will see all the mud removed from the streets.

Losses to Municipal Plants Reach \$300,000.

Hamilton, O.—S. M. Goodman, the municipal expert of Hamilton, after a careful investigation of the municipal activities, declared that the following would cover the Hamilton losses to the municipal plants: Electric light plant, \$60,000; gas plant, \$25,000; water works plant, \$40,000; sanitary sewers, \$50,000; street cleaning, \$75,000. This makes a total of \$300,000.

Women Clean Up Cornwall.

Cornwall, N. Y.—Wealthy women residents of the village of Cornwall, who are members of the Improvement Society, having failed to get the Moodina Creek and adjacent properties cleaned up by the Board of Health after repeated appeals, have formed what they term the Tin Can Committee, and started in a campaign of housecleaning. Mrs. Henry C. Lee is chairman of the committee. Other members include Mrs. Lawrence Abbott, Mrs. Mary Sherwood, Miss Marie Taylor, Miss Lulie, and Miss Josie Taylor. Flanked by a squad of boy scouts, they marched to the Moodina with rakes and hoes and began to clean up the banks of the creek on both sides until rain interrupted their work, which will be continued when the weather permits.

RAPID TRANSIT

Interurban Service to Include Express if Franchise Passes.

Salt Lake City, Utah.—Pursuant to its plans for transportation of fruits and garden trucks from farms adjacent to Salt Lake to markets in Salt Lake, the Utah Light & Railway Company filed with the City Commission application for a permit to carry express and mail matter on its electric cars operated within the city. With specially constructed electric express cars and by parcel post, if permission to carry mails on all cars is granted by the Post Office Department, the street railway proposes to furnish a cheap and rapid means of getting their product to market to the orchardists and small farmers that flourish on the company's suburban and interurban lines. Permission to engage in this branch of transportation has already been granted to the company by the county of Salt Lake, and if the City Commissioners give their sanction the new service, it is announced, will begin as quickly as possible.

MISCELLANEOUS

Mayor Offers Free Gardens.

Boston, Mass.—To encourage thrifty persons in engaging in farming or cultivating on small lines, Mayor Fitzgerald announced that he would give free to the first person to apply the use of several house lots which he owns on Codman Hill, Dorchester. Applications for the use of portions of that land may be made to Martin Meehan, farmer at the Consumptives' Hospital grounds at Mattapan, and Meehan is authorized by the Mayor to allow the use of the land to those inclined to aid in reducing the high cost of living by raising their own vegetables for the coming season. The Mayor's offer of the use of his land was made while he was advocating former National Forester Pinchot's plan for the reclamation of the marsh lands in and about

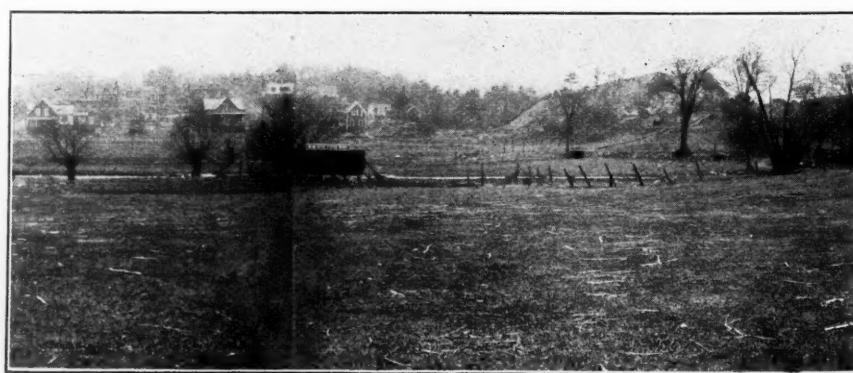
Boston for business and other purposes. The Mayor heartily agreed with Pinchot that there are thousands of acres of marsh lands in and about Boston lying idle, which should be reclaimed, properly filled and put in condition for the erection of manufacturing and other plants.

Will Reclaim Submerged Lands.

Brooklyn, N. Y.—The appropriation of \$10,000 for the reclamation of submerged lands in front of Concourse Park, Coney Island, will come before the Board of Aldermen at their next meeting. The reclamation of these lands will mark the first step toward the construction of the Coney Island boardwalk, recently approved by the city officials. As the Finance Committee of the board has reported favorably on the proposition and no opposition is expected in the board, the money will probably be made available at that time, having already been voted by the Board of Estimate and Apportionment, so that the borough officials can start immediately on the preparation of the plans, specifications and surveys. The concourse lands at Coney Island originally contained seventy acres. They have a sea frontage of 2,750 feet and a uniform depth of 1,000 feet. The shore front has materially changed at the eastern end and for a distance of over 500 feet along the shore the entire lands of the park have washed away. An area of over thirty acres has disappeared at the eastern end and a small amount has been added to the western end. These lands are intersected on the north side, near the center, by the renowned Ocean Parkway. This drive, 210 feet wide, five and one-half miles long, with the concourse lands and improvements, cost, complete, approximately \$1,000,000. The remaining portion of the concourse lands is alone worth many times this amount, and several million dollars would not compensate for the loss of these thirty acres of shore property. During the storm which prevailed on Nov. 24, 1885, the ocean face of the bituminous concrete upon the embankment of the concourse was carried away for a length of 250 feet by 15 feet in width at the eastern end. Several schemes were adopted in an endeavor to save the remaining beach front, but owing to the fact that the Park Department was unable to secure sufficient appropriation to properly protect this property these schemes failed. The Brooklyn Engineers' Club, through the generosity of Alfred T. White, has offered a prize to the engineer who submits the best plans and specifications for the most economical method of reclaiming the lost acres of ocean front. There are forty-eight contestants entered in this competition. They are scattered all over this country and Canada. The engineering schools have also taken great interest in this problem, and the engineering magazines have given it considerable publicity. There is no doubt that this competition will be the means of developing a rational scheme for reclaiming this beach property.

Filled-in Land Will Furnish Playground Site.

Lynn, Mass.—Nicholson pit, located at the base of Breeds Pond reservoir, recently completed at a cost of \$100,000, is to be filled in and converted into a playground for the children of Lynn. The accompanying picture gives a general view of the proposed playground. The reservoir is on the hill in the background.



Courtesy Lynn Evening Item.

PLAYGROUND SITE AT BASE OF RESERVOIR.

LEGAL NEWS

A Summary and Notes of Recent Decisions—
Rulings of Interest to Municipalities

Streets—Rights of Abutting Owners—Excavations.

Sherwin v. City of Aurora.—Where the fee of a street is in the city, an abutting owner has no right to excavate under the sidewalk without the city's consent, and where he owns the fee he has no right to make any use of the street inconsistent with the public use, and, in either case, if an excavation is to be made under the sidewalk, it is the duty of the city to specify the kind of structure to be erected to support the sidewalk, and to require its specifications to be carried out, and hence, in an action for injuries caused by a portion of the sidewalk above such an excavation giving way, it was immaterial whether the city or the abutting owner owned the fee.—Supreme Court of Illinois, 100 N. E. R., 938.

Cement Curbing—Compliance With Specifications.

City of Geneseo v. Schultz et al.—In a proceeding to levy a special assessment for improvements, where an ordinance described a curb surface to be Portland cement mixed with "Missouri limestone screenings of the best quality," and it appeared that "Missouri chat or blue stone" had been used which the evidence showed to be more durable, an objection thereto is without merit.—Supreme Court of Illinois, 100 N. E. R., 926.

State Aid Highways—Responsibility of Town and State.

Glover v. Town of Litchfield.—Under Laws 1907, authorizing a town to improve highways in co-operation with the state highway commissioner, the proceeding being in augmented by vote of the town and application by the selectmen, and completed by approval by the selectmen of the proposals of the state highway commissioner, the town is the responsible author of the improvement, rather than the state, and is responsible in trespass to the owner of land over which the improvement is made, if the proceeding is unlawful.—Supreme Court of Errors of Connecticut.

Proceedings to Establish Highway—Appeal.

Hankamer et al. v. County Com'r's Court et al.—Where a landowner appeared before the jury of view in proceedings to open a road, and made his claim for damages which was not allowed, and subsequently appeared before the commissioners' court, when the jury's report was adopted, and gave notice of appeal as provided by Rev. St. 1895, but failed to prosecute such appeal, he could not thereafter maintain a suit to enjoin the laying out of the road across his land.—Court of Civil Appeals of Texas, 154 S. W. R., 623.

Highways—Guard Rails.

Kerr v. Kiskiminetas Tp.—In an action for injuries to one driving on a highway, where the evidence authorized finding that the road was too narrow, it was properly left to the jury to say whether prudent men would have guarded such place with barriers, and whether the supervisors could have foreseen that, in the absence of such barriers, at the meeting of two vehicles, one of them might be thrown down a declivity.—Supreme Court of Pennsylvania, 85 A. R., 1084.

Sidewalks on Highway Outside of Town—Call Required.

Wurzburger et al. v. Nellis et al.—In an action for injuries sustained on a highway outside an incorporated city or town, it appeared that plaintiff came to the end of a sidewalk and proceeded three or four steps when she fell into a gully. The highway, with sidewalks constructed along a portion of it, had been accepted by the county. The court charged that plaintiff had a right to assume that the sidewalk was in a reasonably safe condition for her to pass over with ordinary care; that the highway included both the roadway and the sidewalks; that those in charge of highways outside of cities and towns were not bound to provide sidewalks, and had no power to do so, except under special circumstances not shown in that case; and that one walking along such a highway had no right to assume that there was a sidewalk at any par-

ticular point. Held, that the instructions were not inconsistent; their purport being that, where sidewalks existed, a traveler was entitled to depend upon their safety, but was not entitled to assume that they continued throughout the entire length of the road.—Supreme Court of California, 130 P. R., 1052.

Road Tax—Distribution.

Commissioners' Court of Tuscaloosa County et al. v. State ex rel. City of Tuscaloosa.—Under Laws 1909, requiring the commissioners' court or board of revenue to pay over to a municipality one-half of the road tax derived from the assessment of property within the municipality, the board has control of the fund derived from such tax, although it has placed the proceeds in the road and bridge fund, and its control is not impaired by Laws 1903, which gives the chairman of the board of public works the authority to draw warrants on the road and bridge fund, and, until such warrants are drawn, the commissioners' court has authority to transfer to a municipality its share of the tax.—Supreme Court of Alabama, 61 S. R., 431.

Highway Law—Constitutionality.

State ex rel. City of Mobile v. Board of Revenue & Road Com'r's of Mobile County et al.—Act Aug. 2, 1907, making the repair of certain streets in the city of Mobile the duty of the board of revenue and road commissioners, and authorizing such board, "in addition to the fund realized from the 'road tax' herein provided for, to set apart and appropriate such amount of the general fund collected under authority of the law as said board may deem necessary to carry out the provisions of this act," contemplates that some part of the general fund, raised by taxes levied by the county, shall be used; and the act is not necessarily in conflict with Const. 1901, §215, limiting the rate of taxation, but will be construed as limiting its implication of expenditure to revenue to be raised otherwise than by special taxes.—Supreme Court of Alabama, 61 S. R., 368.

Highway Commissioner—Personal Liability.

Campbell v. Powers, Commissioner of Highways, Town of Fine.—Laws 1890, now embodied in Consol. Laws 1909, providing that every town shall be liable for all damages to persons or property sustained by reason of any defect in its highways or bridges existing because of the neglect of any commissioner of highways of such town, requiring notice, etc., superseded Laws 1881, relieving highway commissioners from personal liability in such cases and restoring the right of an injured person to use the commissioner individually, which existed prior to the act of 1881. It is only in an action on contract, entered into by a highway commissioner by virtue of his office, that he must be sued in his official capacity. Where, in an action for injuries caused by a defective highway, plaintiff brought suit against the commissioner, the fact that plaintiff added defendant's title of office to his name, and that the body of the complaint alleged that he was a commissioner of highways to show that he had a duty to perform, did not make the action other than an individual one.—New York Supreme Court, 140 N. Y. S., 675.

Pavements—Care Required.

Pugh v. Borough of Springdale.—The care required of a country town or borough in maintaining its pavements in a safe condition for pedestrians is such as would ordinarily be exercised in similar towns.—Supreme Court of Pennsylvania, 86 A. R., 189.

Obstructions in Highways—Abutting Owners' Rights.

Bradley et al v. Degnon Contracting Co., et al.—Abutting owners are entitled to have the highway maintained in front of their premises, with the roadway on which they can freely and without obstruction travel, crossing and recrossing at any place, in vehicle, or on foot, or in any other usual methods of travel in public highways. Abutting owners cannot be deprived of the right to enjoin the operation of a railroad in a street for the transfer of excavated materials from a subway in an adjoining street because the method adopted is less injurious than employing carts.—New York Supreme Court, 140 N. Y. S., 825.

NEWS OF THE SOCIETIES

Calendar of Meetings.

April 28-May 3.
JERSEY CITY MUNICIPAL EXHIBIT.—Fourth Regiment Armory, Jersey City, N. J.—Address Municipal Exhibit, Room 6, City Hall, Jersey City.

May 5-7.
NATIONAL CONFERENCE ON CITY PLANNING.—Annual Meeting, Chicago, Ill. Flavel Shurtliff, Secretary, 16 Congress Street, Boston, Mass.

May 6-8.
GAS, ELECTRIC AND STREET RAILWAY ASSOCIATION OF OKLAHOMA.—Annual Convention, Oklahoma City, Okla. H. V. Bozell, Secretary, Norman, Okla.

May 6-10.
PLAYGROUND AND RECREATION ASSOCIATION OF AMERICA.—Annual Meeting, Richmond, Va.—H. S. Braucher, Secretary, 1 Madison Ave., New York City.

May 12-14.
SOUTHWESTERN WATER WORKS ASSOCIATION.—Second Annual Convention, Fort Worth, Tex. E. L. Fulkerson, Secretary.

May 20-23.
AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Spring Meeting, Baltimore, Md. C. W. Rice, Secretary, 20 West 39th street, New York City.

May 22-24.
OHIO SOCIETY OF MECHANICAL ELECTRICAL AND STEAM ENGINEERS.—Annual Meeting, Springfield, O. F. E. Sanborn, Secretary, Columbus, O.

June 2-6.
NATIONAL ELECTRIC LIGHT ASSOCIATION.—Annual Convention, Chicago, Ill. T. C. Martin, Secretary, 29 West 39th street, New York City.

June 5-7.
CONFERENCE OF MAYORS OF NEW YORK STATE.—Meeting, Binghamton, N. Y. William P. Capes, Secretary, 105 East 22d Street, New York City.

June 9-13.
INTERNATIONAL ASSOCIATION OF CHIEFS OF POLICE.—Twentieth Annual Convention, Raleigh Hotel, Washington, D. C. Major Richard Sylvester, Superintendent of Police, Washington, D. C., President.

June 23-28.
INTERNATIONAL ROADS CONGRESS.—Third Congress, London, England. W. Rees, Jeffreys, Secretary, Queen Anne's Chambers, Broadway, Westminster, London, S. W.

June 23-27.
AMERICAN WATER WORKS ASSOCIATION.—Thirty-third Annual Meeting, Minneapolis, Minn. John M. Diven, Secretary, 47 State street, Troy, N. Y.

June 24-26.
UNION OF TEXAS CHIEFS OF POLICE AND CITY MARSHALS.—Annual Convention, Galveston, Tex. Hollis Baum, Chief of Police, Waco, President.

June 24-28.
AMERICAN SOCIETY FOR TESTING MATERIALS.—Annual Convention, Atlantic City, N. J. Edgar Marburg, Secretary, University of Pennsylvania, Philadelphia, Pa.

July 8-10.
INDIANA LEAGUE OF MUNICIPALITIES.—Annual Convention, Gary. A. P. Melton, Secretary, Gary.

July 22-25.
LEAGUE OF WISCONSIN MUNICIPALITIES.—Annual Convention, Neenah, Wis.

August 25-30.
FOURTH INTERNATIONAL CONGRESS ON SCHOOL HYGIENE, Buffalo, N. Y. Dr. Thomas A. Story, Secretary General, College of the City of New York.

August 24-28.
CENTRAL STATES WATER WORKS ASSOCIATION.—Seventeenth Annual Meeting, Cedar Point, O.—R. P. Bricker, Secretary, Shelby, O.

September 1-6.
INTERNATIONAL ASSOCIATION OF FIRE ENGINEERS.—Forty-first Annual Convention, Grand Central Palace, New York City. James McFall, Secretary, Roanoke, Va.

October 7-10.
AMERICAN SOCIETY OF MUNICIPAL IMPROVEMENTS.—Twentieth Annual Meeting, Wilmington, Del.—A. Prescott Folwell, Secretary, 50 Union Square, New York City.

Playground and Recreation Association of America.

The following topics are among those announced in the preliminary program of the seventh annual meeting, Jefferson Hotel, Richmond, Va., May 6-10:

Steps in the Organization of Municipal Recreation Work.

Systems of Administration of Municipal Recreation.

Financial Campaigns for Recreation Work.

Securing Adequate Appropriations for Recreation Work.

The Administration of An Individual Playground.

The Recreation Center as a Social Institution.

Playground Problems in Municipalities of 25,000.

Playground Problems in Municipalities of Less Than 10,000.

The Necessity of Adequate Training for Recreation Workers.

Practical Problems in the Training of Recreation Workers.

Recreation and City Planning.

Recreation Legislation.

The Laying out of Playgrounds.

The Surfacing of Playgrounds.

The Fencing of Playgrounds.

What Apparatus Does the Boy or Girl Wish to Find on the Playground or in the Gymnasium?

Recreation Buildings

Swimming Pools.

Public Baths.

Stadiums.

National Good Roads Federation

At the convention Birmingham, Ala. April 22-25, about nine hundred delegates were present, the name of the society was changed to United States Good Roads Association and a new constitution was adopted. A meeting will be held early in November at St. Louis. Officers were elected as follows: Senator John H. Bankhead, president; Judge W. I. Grubb, treasurer; J. A. Rountree, secretary; Thomas L. Conway, St. Louis, managing director; Dell M. Potter, Aymer, first vice-president; E. J. Watson, second vice-president; John W. O'Neil, third vice-president.

Vice presidents were then named by as many state delegations as were prepared, the others to be announced later. Those elected were: Alabama, Reuben F. Kolb, John Craft, and V. B. Atkins, with Gardner Green as director; Missouri, F. E. Bartlett, John H. Nolan and Thomas Wilson, with T. T. Fauntleroy as director; California, F. W. Jackson, with Eugene de Rackin as director; South Carolina, R. S. Whalet, D. M. Crossin, and F. H. Hyatt, with F. H. Colcock as director; New Mexico, S. M. Johnson, John R. French and J. W. Low; Tennessee, W. A. Johnson, W. M. Pollard and Cyrus Kelir, with C. C. Gilbert as director; Kentucky, R. G. Railey, with W. W. Duffield as director; Mississippi,

E. J. Morrison, H. F. Broyles, and B. Thomas, with M. T. Kerr as director; Arizona, L. B. Elliot, N. B. Orme and B. F. Billingsley, with J. J. Keagan as director; Alaska, Mrs. S. R. Bernardi, Fay Delezeny and Hugh J. Lee, with Harry Still as director.

Delegates to attend the International Good Roads congress in London were named as follows: J. H. Cook, G. A. Nelson, James Palmer and Robert Woodson.

The following resolutions were adopted:

"Resolved, That this association, voicing the sentiment of the people of the 24 states here represented, urge upon the Congress of the United States the enactment immediately, under the federal constitution, of such legislation in behalf of a general system of good roads and highways as in its wisdom best meet the demands of the moment and of the future.

"Resolved, That the president of this body name a special committee of five representative men to visit Washington at the earliest possible moment and present to the committees of the Congress and to the administration this expression of the American people.

"Resolved, second, That this association recommends that each state should adopt an adequate state highway department.

"Resolved, third, That this association send delegates to the International Good Roads convention, which convenes in London, England.

"Resolved, fourth, That the president is hereby authorized to appoint a committee of three, of which he shall be one, with plenary powers to negotiate and consummate amalgamations with other associations striving for the same purposes."

Congressman Dorey W. Shackleford made the following explanation of the division among the advocates of federal roads legislation.

"One faction, headed by the officers of the American Automobile association, demands that the government shall build and maintain a few transcontinental highways of great perfection, but that not a dollar of federal money should be expended upon any road within a state.

"Another class and by far the larger one, does not believe that roads can compete with railroads as long distance freight lines or as long distance mail routes; that therefore roads should radiate from points about the country, that as the harbor is the terminus of the railroad so the railroad station should be the terminus of the common road. I belong to this latter class."

Central Transcontinental Highway Association

An Indiana division of this association was formed at South Bend, April 16. The officers for the Indiana division for 1913 include David L. Guiffoyle, of this city, president; A. D. Warner, of Mishawaka, vice-president, and U. G. Manning, sec'y-treas.

Ashtabula County, O., Good Roads Meeting

A meeting was held at Hotel Cleveland, Conneaut, O., last week, about 75 persons being present at a banquet. Mayor Lieb presided. When the tables were cleared the chairman called upon S. C. Anderson to explain some tables he had prepared regarding the county road and bridge funds. The tables showed very clearly that the townships that spent the most money had the best roads. C. J. Deckman, Cleveland, president of the Deckman-Duty Co., spoke briefly of the value of practical experience in road building. State Highway Commissioner James H. Marker gave a general review of the road situation in the state and the laws under which money is raised for road building. William C. Perkins of the Dunn Wire Cut Lug Brick company, who for four years was an engineer of the New York State Highway Department, explained the system of construction and maintenance in that state. Deputy County Engineer Manlove, County Surveyor J. S. Matson and County Commissioner Anderson also spoke.

South Dakota Scenic Highway Association

J. L. White of Sioux Falls, in a speech before the meeting of the South Dakota Scenic Highway association, Mitchell, S. D., April 17, recommended bond issues by the state to the amount of \$5,000,000 for building five prominent gravel highways in the state. He suggested the governor call a special election to vote bonds. He declared that 1 cent a day from each taxpayer would lift the debt in twenty years and pay 4 per cent interest on the bonds. He also urged the use of convicts in building the roads. Addresses also were made by Governor Byrne, Commissioner Betz, E. C. Issenhuth and U. G. Reninger. The following officers were elected: President, J. A. Stransky, Pukwana; secretary, E. K. Mather, Mitchell; treasurer, John R. Esmond, Emery, with vice-presidents from each county.

New York State Conference of Mayors.

One of the features of the fourth annual session of the New York State Conference of Mayors and Other City Officials, which will be held at Binghamton on June 5, 6 and 7, will be a symposium on municipal needs. This will occupy the entire third session of the conference and will be in charge of Mayor Frank J. Baker of Utica. Each Mayor or some official designated to represent him will be asked to describe in five minutes his city's most important and immediate problem. After all of the cities have been heard from a general discussion of the needs will be held.

The Mayor's advisory committee has completed a tentative draft of the program for the six sessions. Following the address of welcome by Mayor John J. Irving, president of the conference,

Mayor Rosslyn M. Cox of Middletown will discuss the accomplishments and aims of the conference. Secretary Mayo Fesler, Ohio Municipal League, has been invited to tell the conference what Ohio has done to give its cities home rule, and Governor William Sulzer has been asked to speak on the subject, "The State and the Municipality." The advisory committee hopes to have Attorney General Carmody also present at this session to describe the powers conferred upon the cities of New York State by the new home rule law, enacted at the present session of the Legislature.

At the first evening session subjects of special interest to engineers and members of municipal departments of public works will be discussed. Chief Engineer Nelson P. Lewis of the Board of Estimate and Apportionment of New York City will read a paper on "Proper Kinds of Street Paving for Different Conditions of Traffic," and Hon. William H. Edwards, Commissioner of the Department of Street Cleaning, New York City, will give a talk on "Keeping Streets Clean," illustrated by stereopticon.

On the afternoon of June 6 the Borough President, Cyrus C. Miller of The Bronx will lead a discussion on "What the City Can Do to Reduce the Cost of Living." The reports of the legislative, advisory and city planning committees will be received and acted upon at this session. It is also expected that the conference at this time will take definite action on the establishment of a State Bureau of Municipal Information, plans for which have been drafted and submitted to the Mayors of the State.

Professor George C. Whipple of Harvard University will read a paper at the fifth session on "Sewage Disposal—What Can the City Do to Solve the Problem." Professor Joseph French Johnson, a member of Mayor Gaynor's Commission on New Sources of City Revenue, will discuss ways and means of raising revenue for support of municipal administrations.

At the final session Dr. Talcott Williams, Director of the School of Journalism, Columbia University, will discuss "The Newspaper and Its Relation to the Municipality." The advisory committee is planning to have considered also at this session "The State's New Policy in Health Work and How It Will Effect the Municipalities." The speaker on this subject has not yet been announced.

Assurances have been received that every city in the state will be represented at the conference this year either by its Mayor or some city officials appointed by him as delegates. Secretary W. P. Capes is planning for the accommodation of between 300 and 350 officials.

International Association of Fire Engineers.

The forty-first annual convention of the Association will be held at Grand Central Palace, 46th street and Lexington avenue, New York City instead of at the Madison Square Garden as heretofore announced.

PERSONALS

Atkinson, T. R., Bismarck, N. D., has resigned position as State Engineer and will engage in private practice.

Babcox, Edward S., Rochester, N. Y., formerly advertising manager of the Yawman and Erbe Mfg. Co., is now advertising manager of the Firestone Tire and Rubber Co.

Bennett, Chas. J., State Highway Commissioner, Hartford, Conn., has made the following appointments: R. L. Saunders, Deputy Commissioner, succeeding E. H. Kelsey; W. LeRoy Ulrich, Superintendent of Repairs, succeeding C. J. Nichols; G. E. Hamlin, Assistant Superintendent of Repairs.

Brennen, Thomas M., Niagara Falls, N. Y., has been re-elected County Superintendent of Highways.

Carlisle, John N., Watertown, N. Y., has been appointed Commissioner of Highways of New York State. Mr. Carlisle was City Attorney of Watertown in 1891-1892.

Dunkle, Chas. H., Temple, Pa., has been appointed Road Superintendent in charge of the state highway in Berks and Lehigh counties by State Highway Commissioner Bigelow, succeeding Wm. Dietrich.

Ellsworth, J. A., New Britain, Conn., has been appointed Road Superintendent of Manchester.

Field, John E. Denver, Colo., has been appointed State Engineer, succeeding C. W. Comstock.

Forneri, H. D., Eugene, Ore., has been reappointed City Engineer.

Gorham, E. J., Knoxville, Tenn., has been elected County Engineer, succeeding Capt. G. W. Pearsall.

Harmon, N. R., Lebanon, Ky., has been appointed County Road Engineer.

Hays, H. P., Fort Worth, Tex., has been appointed County Road Engineer.

Knutter, Chas., Ely, Minn., has been appointed City Engineer and William Phillips, Street Commissioner.

Taft, J. R., formerly with Cloverdale & Co., Inc., consulting engineer, 66 Broadway, New York City, has joined the firm of Emory and Eisenbrey, civil chemical and industrial engineers, 2 South 15th street, Philadelphia, Pa. A New York office of the firm will be conducted at 50 Church street.

Tillson, Geo. W., Consulting Engineer, Brooklyn, N. Y., President A. E. Steers and Chief Engineer N. P. Lewis of the Board of Estimate have been appointed to represent New York City at the International Road Congress, London.

Wadham, Arthur, Spokane, Wash., has been appointed City Engineer of Hillyard.

White, Jr., Chas. M., of the Firestone Tire & Rubber Co., has recently located in Detroit as pneumatic tire representative to the Automobile Manufacturers of Michigan. Mr. White formerly represented the Firestone Company in Syracuse.

Wright, James E., Bedford, Ky., has been appointed County Road Engineer.

MUNICIPAL APPLIANCES

Climax Distribution.

The Good Roads Machinery Co., Inc., Kennett Square, Pa., have placed on the market a new distributor capable of handling even the heaviest asphalts, designed on a new principle. The pressure is supplied by a Westinghouse air compressor and the asphalt is carried in a revolvable drum. Other devices comprising the outfit include two sets of distributing valves and nozzles, a heating attachment, and an air reservoir. All of these are mounted on a heavy frame, which in turn is supported by four broad rolls and a folding trailer wheel.

The asphalt drum is so arranged that it can be revolved about the horizontal axis by means of a worm and gear controlled by the operator. The distributing valves and nozzles are placed in two rows along the bottom of the drum, one row being used for applying material in small quantities and both together for the application of materials in large quantities. Two filling holes equipped with air-tight caps having wings attached to facilitate tightening are located in the side of the drum. The capacity of the drum is 150 gallons.

A removable protective casing is fitted around the drum to prevent rapid cooling of the material. At the rear end of the casing is located a warming pan. This pan, which is heated with wood fuel, is so swung on an axle that it can be moved backward away from the casing by means of a counterbalanced lever. Two trap doors are located at the top of the casing in such a position that the filling holes in the drum can be easily reached when the drum is revolved to the filling position. A suitable stack is placed on the casing to facilitate draft and to carry off gases.

A steam driven Westinghouse air compressor is used to develop air pressure for distributing the material. The air is forced into a large reservoir, and a uniform pressure of 90 pounds is maintained in this reservoir by means of an automatic governor controlling the compressor. A drain valve is fitted in the bottom of the reservoir for the removal of condensation. The pressure is introduced into the drum through the hollow axle, and is maintained at 30 pounds by means of a reducing valve in the supply pipe line from the reservoir to the drum. The use of air pressure does away with any possibility of the foaming of material, such as occurs when steam pressure is used.

The distributor is mounted on four rolls, so arranged as to act as one roll for the entire width of the machine, thus giving the road surface a final smoothing or rolling just before the material is spread. The axle which is pitched so as to conform to the crown of the road, is made in two sections, each of which carries two rolls. A steel apron is located between the distributing nozzles and the rolls, to protect them from the spatter of the material.

The distributor is designed to be coupled by means of two bars to the draw bar of any steam road roller or traction engine. The steam supply to the air compressor is furnished by means of a steam hose from the boiler, a regular car coupling being furnished so as to facilitate a quick connection.

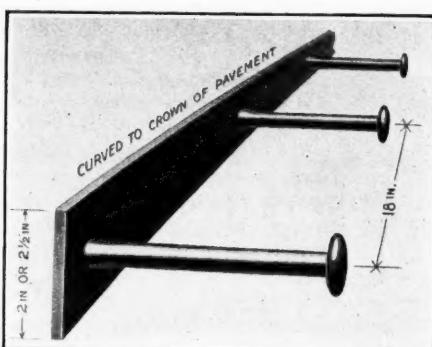
The method of procedure in applying bituminous materials with the Climax Distributor is as follows:

The material should be heated in a heating pan or kettle to the desired temperature. The machine coupled to the roller should then be drawn to the side of the pan or kettle, and the drum revolved until the filling holes are on top. After removing the filling caps the drum should be filled with the heated material by using the large filling funnel, which is equipped with a fine wire screen. The operator can readily determine the amount of material in the tank by watching the second filling hole. When the drum is filled, the caps should be screwed on tight and the trap doors closed.

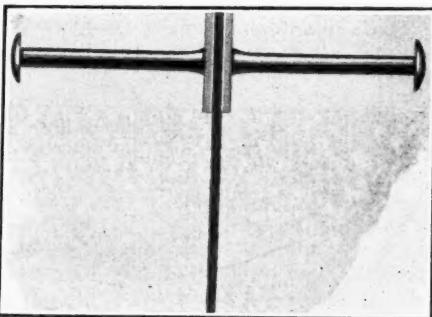
When the drum is filled, if the nozzles are found to be plugged up the drum should be revolved until the nozzles are directly over the heating pan and the material melted out. In the meantime, the nozzles having become warm, the fire pan should be swung back and out of the way and the drum revolved until the nozzles are turned into spreading position. The operating lever should then be linked to the stud in the bar controlling the valves of the set to be used (if a large quantity is to be applied connect both sets to the operating lever) and the pressure applied to the drum. After the successive steps as enumerated in the foregoing have been taken, everything will be in readiness for distribution, which is controlled by the operating levers in the hands of the operator. The machine will distribute Bermudez and Trinidad asphalt.

Trus-Con Armour Plate.

The Trussed Concrete Steel Company, Detroit, Mich., have placed on the market a reinforcement for expansion joints of concrete pavements, called the Trus-Con Armour Plate. In designing this plate the manufacturers had in mind the following requirements: 1. The plate should be thick

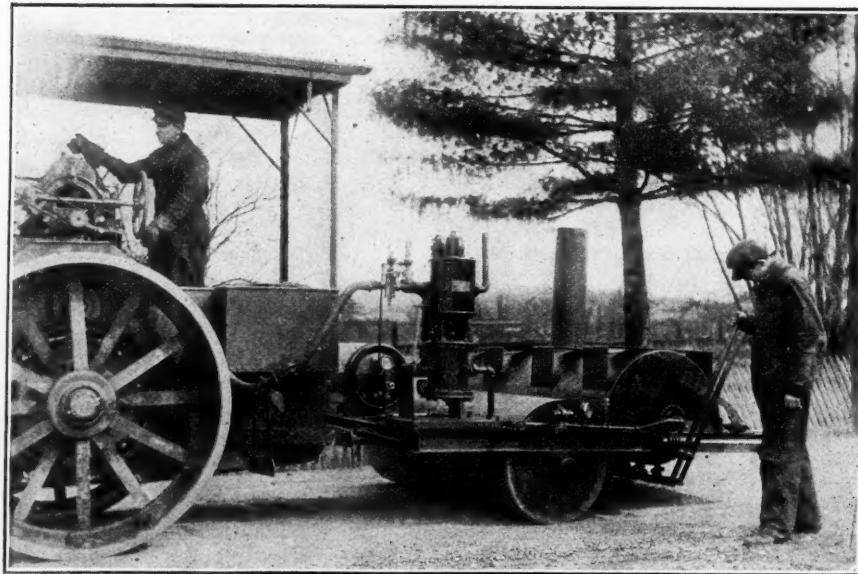


enough, deep enough and hard enough to protect the edge against which it is placed, not only for one year, but for the life of the pavement. 2. Of the proper temper to receive blows and not fracture and to wear evenly with the road surface. 3. Be simple to in-



ARMOUR PLATE AND ANCHOR BOLTS.

stall. 4. Cheap enough to permit of common use. 5. Provide strong enough bond with face of road slab so that it can never wear away under



CLIMAX DISTRIBUTOR FOR ANY GRADE OF ASPHALT OR TAR.

traffic pressure. The plate shown in the illustrations is believed to meet the requirements.

In the construction, none of the steel is cut away. The anchor bolts are cold welded to the plate in such a manner that the $\frac{5}{8}$ -inch bolt itself could be bent and sheared off before a fracture could be made at the point of union. The top of the bolt is 1 inch from the top of the plate and the plate must wear full $1\frac{1}{4}$ -inch before any portion would be in the least weakened. Installation of Trus-Con Armor plate is accomplished by clamping the two bars together with a layer of asphaltum felt cutting entire depth of pavement, as shown in the illustration. Or, if preferred, a steel plate is placed temporarily between the two armor plates and is removed after concrete is poured, the space then being filled with plastic asphaltum. Either process is satisfactory, will allow of expansion and will prevent joint filling with grit; although felt method is somewhat cheaper. The assembled plates are held in place at exact grade line by being attached temporarily to side grade boards and supported by pins driven into subgrade.

Erie Tandem Steam Boiler

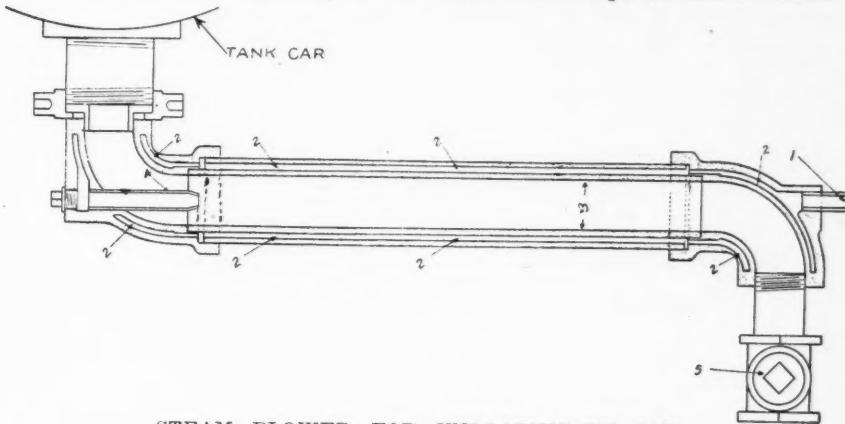
The Erie Machine Shops, Erie, Pa., P. W. Dietly, proprietor, have been making steam rollers for twenty-three years. Every roller is built by templates so every part may be duplicated. Wrought iron and steel are used practically throughout and all parts are guaranteed for one year against breakage resulting from imperfect workmanship or materials.

The main frame is made of 9 inch steel channels, the heaviest made, curved to form the goose neck. All bolts have double nuts. The frame is braced so as to relieve the water tank of all strains. The main axles are of hammered steel. They have an adjustable collar that takes up all side wear. The main bearings are the latest invention. Other rollers have a cap on top and the whole weight is on the two studs that hold the cap. In the Erie the weight is on the solid casting and there are no studs. The boilers are built on the standards adopted by the Massachusetts Inspection Department. Two high-pressure balanced slide-valves reversible engines are used. The cylinders, steam chest and saddle are all cast in one piece. The reverse is made by a spiral slotted sleeve cast solid with the eccentrics and loose on the crank shaft, which gives the roller a quick reverse. The cranks are counterbalanced. The saddle over the front rollers is of extra heavy steel well flanged. It swivels at the center of a steel universal joint, in which the vertical pivot allows the axle to turn for the purpose of guiding the machine and also permits the front axle to assume any angle with the rear axle. The king pin is of forged steel, its journal being in two parts to permit taking up in case of wear. The driving gear is in one

piece; the surfaces of the well head and the gear back are turned in the lathe. The gear and pinion are steel, the teeth stepped. The steering gear consists of a steel quadrant forming a worm gear, keyed to the king pin. In the power steering attachment, power is taken from the crank shaft. The rollers are balanced, hence give equal compression on both sides of the roll and steady motion.

The eight ton roller shown in the illustration is a powerful machine. The boiler is 36 inches in diameter, 66 in-

illustration it will be seen that steam enters the heater through the pipe, 1, passes through the jacket space, 2, around the oil delivery pipe, 3, maintaining a high temperature along its entire length. Steam after passing through the jacket space, passes through the nozzle, 4, into the oil delivery pipe. At the beginning the plug cock, 5, should be closed for a short time forcing steam into the bottom of the tank car and heating the oil until it becomes sufficiently fluid. The plug cock is then opened and oil flows by



STEAM BLOWER FOR UNLOADING OIL CAR.

ches high, has $150\frac{1}{2}$ inch tubes, hydraulically tested to a pressure of 300 pounds, making it safe with a steam pressure of 190 pounds. It is not top-heavy and has a space of 12 inches between the frame and the ground.

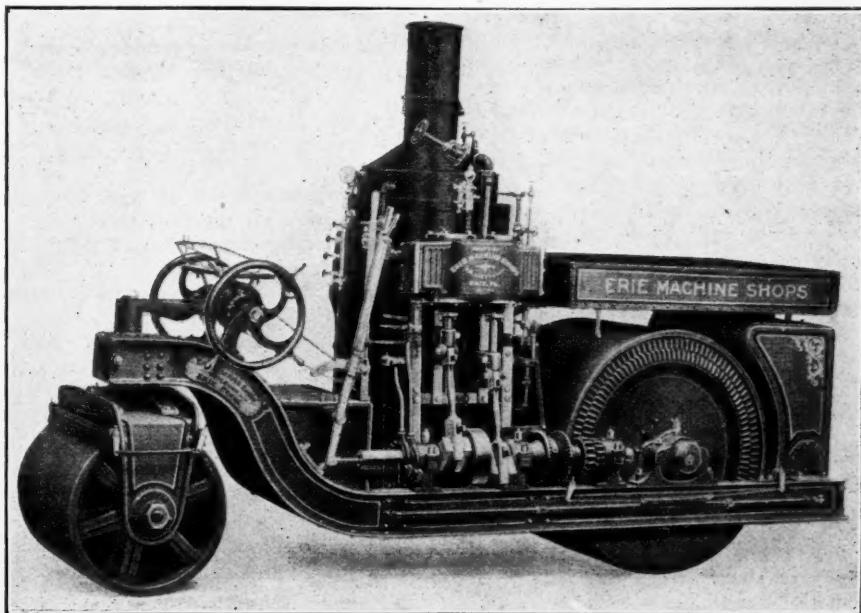
The first roller built by the Erie Machine Shops in 1889 is still in service and is said to be good for several years more.

Device for Unloading Cars of Oil or Tar.

Wm. F. Irish, 95 Milk street, Boston, Mass., has placed on the market a device to facilitate the unloading of cars of oil or tar, called Kent's Oil Heater and Forcer. Referring to the

gravity around the nozzle and then steam forces the oil in a continuous stream through the oil delivery pipe into the tank wagon which is to be loaded.

According to testimonials of responsible persons who have used it this device saves time and labor. Among those who have certified to its usefulness are: George E. Stuart, deputy street commissioner, Newton, Mass.; B. Maloney, Superintendent of streets, Watertown, Mass.; Michael Driscoll, Superintendent of streets, Brookline, Mass.; F. H. Clark, street commissioner, Worcester, Mass.; John A. Williams, superintendent of streets, Framingham, Mass.; Charles L. Berry, division foreman, West Newton, Mass.



EIGHT TON ERIE STEAM ROLLER.

INDUSTRIAL NEWS

Cast Iron Pipe.—Chicago. Lack of business in the larger sizes of pipe and weakness of pig iron market has brought about a reduction of \$1 per ton. Quotations: 4-inch, \$29.50; 6 to 12-inch, \$27.50; 16-inch and up, \$26.50. Birmingham manufacturers still report a dearth of orders for large consignments as well as a lull in inquiries. Stocks are accumulating. Quotations: 4-inch, \$23.50; 6-inch, \$21.50. New York. Private buyers seem to be holding back orders, expecting lower prices, on account of lower price of pig iron. Quotations: 6-inch, car loads, \$23.50 to \$25.

Lead.—Prices have been advanced. Quotations: New York, 4.50c; St. Louis, 4.375c.

Good Roads Year Book.

The second annual issue of a publication of the American Highway Association known as the Official Good Roads Year Book of the United States appeared in April of this year, and is, we believe, without question the most complete compendium of information concerning the highways of this country which has ever been published. In the 520 pages of informative matter there is practically no "padding," and most of the data given appear to be right up to date. For instance, figures are given concerning work done in 1912 and contemplated for 1913, many of which have not been available for more than a month or two. It is impossible within the limits of a review to give more than a bare idea of what this book contains, but the general topics covered are as follows: A brief description of road systems in foreign countries; history and present status of the movement to secure national aid to road improvement; synopsis of the laws of each state relating to public roads (these synopses occupy about 130 pages); general description of each of the types of roads in more or less common use; a general discussion on highway bridges and culverts, accompanied by plates giving the standard plans of the Office of Public Roads; brief discussions of the subjects of road repair and maintenance and dust preventives. The Massachusetts specifications for state highways are given in full. Following this comes thirty-two pages of progress reports and further notes from each state, giving the state aid appropriations and expenditures and the mileage of roads in each of the states. There are also lists of the highway officials of each of the states; the road and bridge bond issues of each of the states, giving amount, interest, term of years, etc., including the bonds voted for 1913; a brief statement concerning the courses in highway engineering which are given by various colleges and other schools; a bibliography of road, bridge and culvert construction and allied subjects, giving both textbooks and bulletins, circulars and other documents; a list of patents

pertaining to good roads issued in 1912; a list of copyrighted trade-marks for road materials and road machinery; a description of the several patented methods of road construction; a statement as to the use of convict labor on road work in each of the several states; a list of associations interested in roads and highways, both state and national; a list of manufacturers of road machinery, road materials, etc., and of road, bridge and street contractors.

It is apparent from the above that this book will be of great value to any student of highway construction, legislation or promotion. As already stated, the information appears to be as nearly up to date as is possible to make it, and we suppose that it is reliable, as in most cases it appears to have been obtained from official reports, or special information furnished by the heads of state and local highway departments. The editor is J. E. Pennybacker, Jr., who also was the statistician of the joint congressional committee on federal aid in the construction of post roads, which is referred to elsewhere in this issue.

Cogswell's Dustsetter.—James A. Cogswell, 1520 Real Estate Trust Bldg., Philadelphia, Pa., is now marketing under the name Cogswell's Dustsetter a product formerly known as Dustsetter. The material is claimed to be odorless, antiseptic, stainless; it is also said to be a disinfectant and not to injure automobile tires. It is described as a chemical preparation readily soluble in water which after being spread upon the streets from a watering cart forms a coating that is continually drawing moisture from the atmosphere. Cogswell's Dustsetter is put up in packages which are simply emptied into a watering cart.

Creolitic.—At some time during this season the Mack Mfg. Co., Philadelphia, Pa., will lay sample sections of Creolitic pavement, a material patented for which have been applied for by J. S. E. Pardee, formerly with the United States Wood Preserving Company. The pavement mixture is made in the following manner: Sawdust thoroughly seasoned and dried is mixed with a preservative oil, preferably creosote, a blend of creosote and tar or asphaltum. Incorporated in the mixture of preservative oil and sawdust is chalk, lime or finely sifted ashes, these all to be mixed at a temperature of 140 to 180 degrees centigrade. To this is added at a like temperature a mineral aggregate of gravel or stone composed of about three parts of mineral aggregate to one part of the composition. The mixture is to be laid in accordance with the usual practice regarding bituminous sheet pavements or is to be moulded into blocks.

Rubber Goods.—Beginning with a May issue the B. F. Goodrich Company, Akron, O., will publish a mag-

azine devoted to motor interests generally.

Silica Road Pebble.—The Portage Silica Co., 503 Stambaugh Building, Youngstown, O., have placed on the market a material, silica pebbles, which are said to have special merits for paving purposes. The Silica Road Pebble is obtained by disintegrating a conglomerate rock, washing and screening the disintegrated product. As put upon the market, the material is a light colored, almost white gravel, which is very hard and wear resisting. It is used principally for the wearing surface of either macadam or concrete roads. It has no inherent cementing qualities and, therefore, must be used in conjunction with a good binder. A top dressing of Silica Road Pebble with a suitable asphalt or tar binder makes a road surface which is dustless and noiseless and affords a good tractive surface for both animal and motor-driven vehicles. The pebbles are screened to three standard sizes. The use of the material is comparatively new, the oldest road having been built only four years ago. In every case, it is said, the results have been excellent and satisfactory.

Manufacturers' Agent.—C. Wadsworth, 961 Woodward avenue, Detroit, Mich., has opened an office as manufacturers' agent for municipal equipment and supplies. Mr. Wadsworth also proposes to furnish engineering service in connection with the installation and operation of the apparatus which he sells. He would like to get in touch with the sales managers of concerns whose product is well known in the engineering-contracting field but who are not satisfactorily represented in Michigan.

Motor Trucks.—The B. F. Goodrich Company, Akron, O., a booklet, entitled, "A New Authentic Book of Reference of What's What in Motor Trucks." The booklet is pocketbook size, 70 pages illustrated and gives a description of more than 60 1913 American models.

Fire Apparatus.—Haney Fire Fighting Apparatus Co., Edward H. Haney, president, Stockton, Cal., purchased site of 31 acres, at Tampa, Fla., and will erect three buildings costing \$50,000, to be equipped for manufacturing fire-fighting apparatus.

Trenching Machinery.—The Monihan Machine Company, 2024 Carroll avenue, Chicago, Ill., manufacturers of ditching machines, has had plans prepared for an addition, 25x123 feet, two stories, to its machine shop, to cost \$16,000.

Road Machinery.—The American Highway Supply Company, Terre Haute, Ind., has been incorporated, to deal in bridges and road machinery. The directors are W. A. Braden, A. D. Huff and J. A. Shepherd.

WEEKLY CONTRACT NEWS

ADVANCED INFORMATION BIDS ASKED FOR

CONTRACTS AWARDED ITEMIZED PRICES

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also correction of any errors discovered.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
STREETS AND ROADS				
Minn., Nevish	2 p.m., May	3.. Grading road	C. A. Deitel, Twn. Clk.	
Pa., Westchester	6 p.m., May	5.. Macadamizing	N. R. Rambo, Boro. Engr.	
Ohio, Stubenville	noon, May	5.. Paving retaining walls sidewalks, etc.	J. P. Gavin, Dir. P. S.	
N. J., Newark	3 p.m., May	5.. Sprinkling 75 miles with road oil.	F. A. Reimer, Co. Engr.	
Ia., Albia	4 p.m., May	5.. Cement sidewalks during 1913.	H. S. Berry, Mayor.	
Wis., Watertown	May	5.. Creosoted block 3 bridges; cost, \$7,000.	Frank Webber, C. C.	
Ind., Laporte	May	5.. Asphaltic concrete resurfacing, 35,000 yds.	Wm. Krueger, C. Clk.	
La., New Iberia	4 p.m., May	5.. Concrete walk, 322,110 sq. ft. sidewalk & 71,572 ft. curb.	J. S. Power, Mayor.	
Ind., Hartford City	May	5.. Two roads	Jas. Cronin, Co. Aud.	
Ind., Jeffersonville	10 a.m., May	5.. Two highways	G. W. Stoner, Co. Aud.	
N. J., Plainfield	May	5.. Macadam, 28,000 yds.	J. T. MacMurrey, City Clk.	
N. J., Westfield	May	5.. Macadam, 3,400 yds.	A. W. Vars, Town Engr.	
Ohio, Girard	Noon, May	5.. Paving sidewalks, crosswalks, &c.	J. E. Stotler, Vil. Clk.	
Wis., Ellsworth	8 p.m., May	5.. Cement sidewalks, &c.	C. B. Wood, Vil. Clk.	
Minn., Minneapolis	11 a.m., May	5.. Grading, graveling, &c.	A. P. Erickson, Co. Audr.	
Pa., Eddystone	10 a.m., May	5.. Paving, any material.	D. S. Heisner, Chmn Comm.	
Canada, Kingston	May	5.. Pavements	R. J. McClelland, C. Engr.	
Minn., Duluth	10 a.m., May	5.. Improving streets.	R. Murchison, Comr.	
Mass., Boston	noon, May	5.. Tar-macadam, curbstones, sidewalks, &c.	L. K. Rourke, Comr.	
N. Y., Waverly	5 p.m., May	5.. Cement pavement, curb and gutter.	E. D. Sebring, Vil. Clk.	
N. J., Hillsdale	8.30 p.m., May	5.. Macadamizing, 2,166 lin. ft.	H. G. Hering, Twnshp. Eng.	
Ind., Franklin	2 p.m., May	5.. Gravel road	H. L. Knox, Co. Aud.	
Ind., Fowler	1 p.m., May	5.. Macadamized roads	W. Mankey, Co. Aud.	
Pa., Erie	8 p.m., May	5.. Brick or sheet asphalt, 8,500 yds.	B. E. Briggs, C. Engr.	
Fla., Tampa	May	6.. Paving brick and granite curbing.	D. B. McKay, Chrmn. Comrs.	
Va., Virginina	May	6.. Concrete sidewalks, 5,000 yds.	W. W. Tuck, Chrmn. Com.	
N. Y., Auburn	8 p.m., May	6.. Asphalt or vitrified brick.	J. S. Hanlon, C. Clk.	
Kan., Manhattan	May	6.. Brick, asphaltic concrete, etc. 35,000 yds.	O. E. Noble, C. Engr.	
Wash., Ellensburg	May	6.. Permanent highway, 11,000 sq. yds.	C. T. Jordan, Co. Engr.	
Ohio, Delaware	noon, May	6.. Brick, asphalt, wood and macadam.	E. L. Martin, Clk.	
Ind., Kokomo	10 a.m., May	6.. Gravel and stone roads.	E. B. Swift, Co. Aud.	
Ind., Decatur	10 a.m., May	6.. Macadam	T. H. Baltzell, Co. Aud.	
Ind., Princeton	10 a.m., May	6.. Gravel roads	W. T. Roberts, Co. Aud.	
Ind., Marion	2 p.m., May	6.. Stone road.	T. H. Kimball, Co. Aud.	
Ind., Monticello	10 a.m., May	6.. Highway	A. G. Fisher, Co. Aud.	
Ind., Sullivan	noon, May	6.. Stone and gravel roads.	W. S. Bicknell, Co. Aud.	
Ind., Delphi	noon, May	6.. Highway	M. G. Haun, Co. Aud.	
Ind., Winnemac	noon, May	6.. Gravel road	W. Munchenburg, Co. Aud.	
Ind., Washington	2 p.m., May	6.. Pike roads	L. S. Core, Co. Aud.	
Ind., Crawfordsville	10 a.m., May	6.. Gravel roads	B. B. Engle, Co. Aud.	
Ind., Vincennes	2 p.m., May	6.. Three gravel roads	J. P. Scott, Co. Aud.	
Ohio, Toledo	10 a.m., May	6.. Macadamizing highway	C. J. Sanzenbacher, Co. Aud.	
S. C., Charleston	8 p.m., May	6.. Standard pavement, any kind, 30,000 yds.	J. H. Dingle, C. Engr.	
Ind., Wabash	1 p.m., May	6.. Four highways in Noble township.	D. Showalter, Co. Aud.	
Miss., Calhoun City	May	6.. Concrete sidewalks, 1 mile.	P. D. Williams, Clk	
Fla., Palatka	May	6.. Concrete sidewalks, 3 miles.	S. C. Stallings, C. Engr.	
Minn., Brainerd	2 p.m., May	6.. Creosoted blocks on bridge.	J. F. Smart, Co. Aud.	
Ohio, Cleveland	noon, May	6.. Silica gravel road oil or tar.	W. J. Springborn, Dir. P. S.	
N. Y., Brooklyn	11 a.m., May	7.. Sidewalks, sheet asphalt, iron slag, granite.	A. E. Steers, Boro. Pres.	
N. D., Ray	8 p.m., May	7.. Five concrete crossings on Main St.	C. C. Johnson, Vil. Clk.	
Ia., Decorah	May	7.. Cement sidewalks and culverts for 1913.	F. M. Hughes, C. Clk.	
Ind., Shelbyville	10 a.m., May	7.. Gravel road, Union township.	F. W. Fagel, Co. Aud.	
Ind., Muncie	10 a.m., May	7.. Stone road.	F. M. Williams, Co. Aud.	
Pa., Ashland	May	7.. Brick or Amesite, 15,600 yds.	J. W. Ritz, Boro. Secy.	
Ind., Crown Point	noon, May	7.. Gravel road	C. A. Johnson, Co. Aud.	
Ind., Bloomington	2 p.m., May	7.. Pike road.	W. F. Kinser, Co. Aud.	
Ind., Columbus	10 a.m., May	7.. Macadamized roads	Jacob Stucker, Chrmn. Comrs.	
Ohio, Canton	May	7.. Brick pavement, 18,900 yds.	J. H. McConnell, Co. Aud.	
Va., Waynesboro	May	7.. Macadam, 38 miles	P. St. J. Wilson, Hwy. Comr.	
N. H., Concord	1 p.m., May	7.. Surfacing with gravel	S. P. Hooker, Supt. Hwys.	
Ind., Corydon	2 p.m., May	8.. Gravel roads	J. L. O'Hannon, Co. Aud.	
Tex., Nacogdoches	May	8.. Pavements, any kind, 10,000 yds.	J. R. McKinney, Secy.	
Ind., Fort Wayne	May	8.. Sidewalks, 8 miles	F. J. Benoy, Chrmn. Bd.	
N. J., Belvidere	11.45 a.m., May	8.. Macadam, 4½ miles.	J. R. Thatcher, Dir.	
Ark., Fayetteville	2 p.m., May	8.. Pavement, 20,000 yds; cost, \$45,000.	J. Fulbright, Secy. Dist.	
Ohio, Middlefield	May	8.. Tar concrete	Joe. White, Vil. Clk.	
Ind., New Albany	11 a.m., May	8.. Highway	J. T. Miller, Co. Aud.	
Ind., Evansville	10 a.m., May	8.. Macadamizing highway	C. P. Beard, Co. Aud.	
Minn., Jackson	May	8.. Improving state road	P. D. McKellar, Co. Aud.	
Pa., Mechanicsburg	noon, May	8.. Paving	S. E. Basehore, Secy.	
Fla., Jacksonville	10 a.m., May	9.. Vitrified brick, concrete, 2 roads.	Bd. of Duval Co. Comrs.	
Mich., Flint	3 p.m., May	9.. Pavement, 37,000 sq. yds.	D. E. Newcombe, C. Clk.	
Ohio, Dennison	noon, May	9.. Grading, paving and curbing (2 contracts).	John A. Fouts, Vil. Clk.	
Ill., Crete	May	10.. Hard roads, 10 miles	S. Rose, Town Clk.	
Ind., Franklin	2 p.m., May	10.. Gravel road	H. L. Knox, Co. Aud.	
Ariz., Phoenix	May	10.. Concrete or oil macadam, 3 miles.	H. A. Cooke, Engr.	
S. D., Watertown	May	12.. Pavement, 45a000 yds.	O. M. Lane, City Aud.	
N. J., Camden	10 a.m., May	12.. Asphaltum road dust oil, 50,000 gals.	J. P. Earl, Chrmn. Comm.	
Ala., New Decatur	May	12.. Bituminous concrete, etc.	H. Hartung, C. Clk.	
Pa., Harrisburg	10 a.m., May	13.. Bituminous macadam penetration, 3 roads, 10 miles.	E. M. Bigelow, Hwy. Comr.	
Fla., Pensacola	Noon, May	13.. Concrete pavement, 22,000 yds.	Geo. Rommell, C. Engr.	
Ind., Vincennes	May	13.. Brick, sheet asphalt Bitulithic or wood.	J. B. Hershey, City Engr.	
Ohio, Cleveland	11 a.m., May	14.. Taylor No. 2 Road improvement.	J. F. Goldenbogen, Co. Clk.	
Pa., Scranton	Noon, May	14.. Asphaltic macadam	Co. Comrs.	

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
Ind., Fort Wayne	10 a.m., May 15	Paving three miles	C. H. Brown, Co. Aud.	
O., Columbus	2 p.m., May 15	Waterbound macadam, 1.03 miles in Union; Bit. surface concrete, 0.71 miles in Madison	J. R. Marker, State Hwy Comr	
Okla., Tulsa	May 15	Paving, 15 blocks	T. C. Hughes, C. Engr.	
Wis., Wausau	May 16	Seven blocks of vitrified brick	Bd. Pub. Wks.	
Sask., Regina	Noon, May 15	sidewalks and pavements	F. McArthur, City Engr.	
Manitoba, Winnipeg	May 15	Refined asphalt and fluxing oil	Bd. of Control.	
Pa., Donora	May 15	Brick	George Allen, C. Clk.	
N. J., Camden	10 a.m., May 17	Asphaltum road dust oil, 40,000 to 50,000 gals.	J. P. Earle, Chrmn. Comm.	
Ia., Belle Plaine	May 19	Brick, 8,400 sq. yds.	E. M. Ewen, C. Clk.	
Ala., Montgomery	May 19	Gravel roads, 6 miles	T. H. Edwards, Co. Engr.	
Ala., Ashville	May 20	Chert road	Road Comrs.	
N. Y., Niagara Falls	May 20	Paving two streets	Bu. Pub. Wks.	
N. Y., Hudson	10.30 a.m., May 20	Relaying 4,975 lin. ft. curbstone, 13,600 sq. yds. vitrified brick	H. M. James, Sec. Com. P. W.	
Fla., Pensacola	May 27	Granocrete, 22,000 yds.	G. Rommel, Jr., Ch. Engr.	
Wash., Seattle	June 1	County roads, 6.4 miles	Co. Comrs.	

SEWERAGE

Wis., Racine	10 a.m., May	3. Sewers; 6 contracts	P. H. Connolly, C. Engr
Pa., Westchester	May	5. Sewers	N. R. Rambo, C. Engr.
Pa., North East	8 p.m., May	5. Tile sewers, 3,848 ft. 8-in.	J. N. Leet, Boro. Secy.
Ont., Western	Noon, May	5. Sedimentation tanks, percolating filters, dosing chamber, etc.	J. H. Taylor, Clk.
Sask., Regina	Noon, May	5. Sewer pipe, 103,000 ft. 6 to 24-in.; 4,000 ft. 30 to 42-in.	F. McArthur, C. Engr.
Ia., Carroll	May	5. Sanitary sewers, 53,300 ft. 6 & 8-in.	J. L. Dougherty, C. Clk.
Ala., Birmingham	May	6. Concrete sewer, 6,000 ft.; 5,000 ft. brick sewer, 10,000 ft. laterals	W. G. Kirkpatrick, City Engr.
Wis., Evansville	Noon, May	6. Sanitary sewer, 6,198 ft.; 1,900 ft. storm sewer	F. W. Gilman, City Clk.
O., Delaware	noon, May	6. Sanitary sewers, 2 streets	E. I. Martin, Clk.
N. Y., Amsterdam	8 p.m., May	6. Sewers; 4 contracts	J. P. Wilson, Clk.
N. Y., Dunkirk	May	6. Vitrified pipe; 5,700 ft. 10-in.	J. M. Hackett, C. Engr.
O., Idlewood	noon, May	6. Sewers several streets	Pease Engr. Co., Cleveland.
Ia., Davenport	2 p.m., May	6. Sewer	A. M. Compton, C. Engr.
D. C., Washington	May	7. Intercepting sewer; cost, \$40,000	Comrs.
O., Celina	May	7. Storm and sanitary sewers	W. J. Sherman, Co., Toledo.
Md., Baltimore	May	7. Vit. pipe, 7,200 ft. 8 to 10-in.	Bd. of Awards.
N. J., Trenton	2.30 p.m., May	7. Drains	Frank Thompson, City Clk.
Mo., California	May	7. Sewer laterals, 4 miles	Burns & McDonnell, Engrs., Kansas City.
N. Y., Oneonta	8 p.m., May	7. Intercepting sewer; vit. pipe, 9,150 ft. 10 to 21-in.	S. H. Close, C. Clk.
Wis., Appleton	9 a.m., May	8. Sewer	E. L. Williams, C. Clk.
Minn., Thief River Falls	8 p.m., May	9. Sewers in two districts	W. H. Quist, C. Clk.
Ill., Abington	May	9. Storm and sanitary sewers; cost, \$25,000	A. L. Richey, C. Engr.
Sask., Weyburn	May	12. Sewerage filtration plant, laying sewer & water pipe	J. D. Murray, Sec.-Treas.
Neb., Geneva	2 p.m., May	12. Concrete pipe, 4,000 ft. 36-in.	F. B. Ashton, Dist. Secy.
La., Ruston	May	15. Sewerage system	S. D. Pearce, Pres.
Mass., Fitchburg	May	15. Tanks, filters, &c; cost, \$200,000 to \$300,000	D. A. Hartwell, Chf. Engr.
Sask., Regina	Noon, May	15. Sewer pipe, 103,000 ft. 6 to 24-in.; 4,000 ft. 30 to 42-in.	F. McArthur, C. Engr.
La., Ruston	Noon, May	15. Sewer system; cost, \$40,000	S. B. Pearce, Pres. Bd.
Pa., Washington	May	19. Vit. pipe, 3,200 ft. 4 to 8-in.	D. C. Morrow, Engr.
O., Fostoria	May	20. Vitrified or cast-iron pipe, 1,100 ft.	Chas. Latshaw, C. Engr.
Ind., Ft. Benj. Harrison	10 a.m., May	21. Alterations to sewage disposal plant	Maj. R. S. Smith, Q. M. Corps.
O., Ravenna	June	2. Settling tanks & siphons; cost, \$10,000	W. H. Linton, Dir.

WATER SUPPLY

Ia., Rock Rapids	May	5. Water mains	J. K. Medberry, C. Clk.
Wyo., Glen Rock	May	5. Waterworks	C. C. Carlisle, Cheyenne, Engr
Ind., Decatur	noon, May	6. Reservoir, 230,000 gals.	H. M. Devoss, C. Clk.
Ia., Cherokee	8 p.m., May	6. Cast iron pipe, hydrants, valves, etc.	W. Shardlow, C. Clk.
Pa., Blairsville	May	6. Pumping station and equipment	E. J. O'Brien, Engr., Latrobe.
N. Y., Buffalo	11 a.m., May	6. Platform around purifier plant	R. G. Ward, Comr.
N. Y., Mexico	2 p.m., May	7. Water mains, 9 miles, 860 tons; pumps, filters, &c.	W. J. Collins, Chrmn. Comrs.
O., Willoughby	May	10. High service pumps, etc.	Bd. of Pub. Affairs.
Canada, Regina	noon, May	12. Water mains	J. M. Mackay, Supt.
Kan., Madison	May	15. Waterworks	Rollins & Westover, Kan. City.
Quebec, Montreal	May	16. Enlarging aqueduct, 203,000 cu. yds. concrete, &c; cost \$2,500,000	L. Senecal, Secy.
Mont., Billings	June	17. Pumping plant	C. E. Durland, City Engr.
Ky., Henderson	9 a.m., May	27. Corrugated metal culverts	S. H. Kimmel, Engr.
Egypt, Cairo	July	1. Furn. equipm't for pump'g station, 7,000,000 meters	Pub. Works Ministry.

LIGHTING AND POWER

O., Cleveland	noon, May	5. Gas and electric fixtures for station	W. J. Springborn, Dir. P. S.
Va., Covington	May	5. Franchise for electric light plant	W. C. Wright, Clk. Council.
D. C., Washington	2 p.m., May	5. Oil engine and generator, 25-H.P.	C. H. Rudolph, Chrmn. Comrs.
Minn., Lesueur Center	Noon, May	6. One or two steam boilers	J. H. Kaersatt, Co. Aud.
Neb., Oxford	May	9. Lighting plant; cost, \$8,950	C. V. Sturtevant, C. Engr.
Fla., Chipley	May	13. Engines, generators and distribution system	Light & Power Co.
Manitoba, Winnipeg	11 a.m., May	15. Large generators for turbines	M. Peterson, Secy.
O., Toledo	10 a.m., May	19. Power house for hospital	C. J. Sanzenbacher, Co. Aud.
Ind., Goshen	3 p.m., May	19. Generator, 250 KVA. lamp equipment, etc.	Burns & McDonnell, Engrs., Kansas City, Mo.
N. J., Camden	8 p.m., June 15	Power station, boiler & generating equipment, electrical work for station & distribution system	F. A. Finkelday, Chrmn. Com.
N. J., Camden	June 16	Underground conduits, 219,000 ft., subway, 24,000 ft., 128 standards, &c.	C. Council.
Chile, Santiago	Sept. 10	1. Illuminating plant for port works	Comision de Puertos.

FIRE EQUIPMENT

Pa., Forty Fort	May	5. Auto fire truck	W. T. Pettibone, Chrmn. Com.
Minn., Eveleth	8 p.m., May	6. Indicator and gong	D. P. McIntyre, C. Clk.
Mass., Fall River	11 a.m., May	8. Two motor combination hose and chemicals	Bd. of Fire Comrs.
Sask., Moose Jaw	May	9. Motor apparatus and alarm system	City Secy.

BRIDGES

Minn., Fairmont	2 p.m., May	3. Concrete bridge, 16 ft.	W. G. Brown, Chrmn. Bd.
N. J., Camden	11 a.m., May	6. Four bridges	J. J. Albertson, Co. Engr.
B. C., Victoria	May	7. Concrete bridge over river	J. E. Griffith, Engr. P. Wks.
O., Cleveland	11 a.m., May	7. Concrete bridge	J. F. Goldenbogen, Clk.
Ind., Evansville	10 a.m., May	8. Three concrete bridges	H. W. Hartig, Chrmn. Comrs.
N. J., Camden	11 a.m., May	12. Four bridges	J. J. Albertson, Co. Engr.
Minn., Red Wing	1 p.m., May	13. Five bridges	C. H. Meyer, Co. Aud.
N. D., Cavalier	2 p.m., May	14. Bridges during 1913	W. W. Felson, Co. Aud.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
Ill., La Salle	May 15.	Steel and concrete bridge	A. Johnson, State Engr.	
Miss., Long Beach	7.30 p.m., May 15.	Concrete bridge	Wm. Tell, Twn. Clk.	
N. J., N. Brunswick	2.30 p.m., May 19.	Concrete bridge	P. H. S. Hendricks, Dir.	
Kan., Kansas City	May 19.	Reconstrn. bridge	F. M. Halcomb, Co. Engr.	
MISCELLANEOUS				
N. C., Lumberton	May 5.	Two jail cells	Robeson Co. Comrs.	
N. J., Red Bank	5 p.m., May 6.	Removing garbage, ashes and rubbish	A. C. Harrison, Boro. Clk.	
D. C., Washington	2 p.m., May 6.	Three automobiles, gasoline hoisting engine, electric hoist	Commissioners.	
Pa., Philadelphia	noon, May 6.	Automobile for police department; alterations to station	G. D. Porter, Dir.	
N. Y., Oneida	May 6.	Sprinkling streets	Bd. Pub. Wks.	
N. J., Camden	May 7.	Fire escapes, &c., County Bldg.	Jacob Price, Chrmn. Com.	
N. J., Belleville	May 14.	Town hall	Town Clk.	
Cal., Los Angeles	June 20.	Bldg. & operating garbage disposal plant. Reduction or incineration	Bd. of Public Works.	

STREETS AND ROADS

Oneonta, Ala.—Commissioners are receiving bids for county bonds and it is thought they will have no trouble in placing \$150,000 bonds recently voted for good roads in Blount at good figures.

Opelika, Ala.—After discussing and deliberating over matter at two or three council sittings, mayor and board of aldermen have decided to use vitrified brick on North and South Railroad aves. and Ninth st., dollarway pavement on Avenue A and Tassom compressed concrete pavement on 8th st. City Engineer Mitcham has been directed to prepare detailed specifications and surveys showing paving, drainage, curbing and plans for contractors to follow in construction work.

Los Angeles, Cal.—Council has decided to make another start on widening of Griffin avenue, from Avenue 28th to Avenue 57th.

Roseville, Cal.—Bond election of \$20,000 to carry State highway through city has been carried. Distance of north and south road is 1.88 miles and laterals will be some 4,000 ft. more.

Roseville, Cal.—Bonds in sum of \$20,000 have been voted to construct link in state highway through town.

Sacramento, Cal.—State Treasurer Roberts has sold latest \$800,000 block of California highway bonds with such dispatch that California Highway Commission has determined to offer more in near future.

Denver, Colo.—The Denver park commission will expend all of mountain park appropriation for this year in building of roads and engineering work through foothills back of Golden and Morrison.

Waterbury, Conn.—Grading of various streets has been authorized.

Waterbury, Conn.—Board of public works has voted to recommend to board of aldermen that a lay-out of Kendrick street be made.

Wilmington, Del.—Construction of roadway from Concord turnpike to present old railroad bridge, then by way du Pont st. across Park drive and up to Lancaster ave. is being discussed.

Fort Myers, Fla.—Plans for paving streets of this city, bonds for which have been voted, are all completed. Streets to be paved with shell, rolled and oiled, have been decided upon, and as quickly as bonds are made accessible, contract will be awarded and work commenced.

Port St. Joe, Fla.—A movement is on foot to better roads of Calhoun county, particularly road leading from Blountstown to Port-St. Joe.

St. Augustine, Fla.—Plans for plank road extending over outer sand barrier to ocean beach are now on foot and are being backed by residents of Crescent Beach, where plank road will be built.

St. Augustine, Fla.—Ordinance has been passed for paving with asphalt macadam of Carrera st. from Cordova to Malaga.

St. Augustine, Fla.—Petitions will shortly be circulated in all sections of county, asking for calling of election for hardsurfacing with tarred shell, bound with cypress curbing, a complete system of highways in St. Johns county. Petition calls for issue of \$400,000.

Tampa, Fla.—Bond issue of \$1,000,000, money to be devoted to laying brick pavements on county roads, will be proposition laid before people of this county at early date. It is figured that 100 miles of brick roads could be built out of million-dollar bond issue.

Atlanta, Ga.—West Mitchell st. property owners have asked committee to place \$7,000 in January budget for regrading their street at disposal of

Mishawaka, Ind.—Board of Public Works has instructed clerk to advertise for bids for paving of South Main from Lake Shore right of way to Eleventh street.

Muncie, Ind.—C. L. Friddle and others have filed petition with county auditor to be presented to board of county commissioners asking for construction of new gravel road in Delaware Township. Road in question is to begin at northeast corner of southwest quarter, section nineteen, and runs in northerly direction. May 7 has been set as day when petition will be heard by commissioners.

Richmond, Ind.—Board of works has decided to call for bids for oiling streets by contract. Streets to be oiled will be determined by petition of residents.

South Bend, Ind.—Resolution has been adopted for paving of High and Dunham streets.

Lexington, Ky.—Resolution has been adopted for improvement of various streets. J. J. O'Brien, city clerk.

Lexington, Ky.—Ordinances have been passed authorizing reconstruction of Second st. from Limestone to Broadway; Paterson, from Main to Vine; East Short st., from Walnut to Dewees; Spring st., from Main to Vine, and Mechanic st., from Limestone to Market, with asphalt or other permanent material.

Lexington, Ky.—Style of material to be used on South Mill st., from High to Cedar, in reconstruction of that street will be Type C asphalt, instead of Type A as originally provided in contract with Carey & Reed, and upon application by property owners, contracting firm has agreed to have contract changed.

Mt. Sterling, Ky.—Construction of road from here to Maysville is under consideration.

New Albany, Ky.—City Clerk Trouly has been directed to advertise for bids on improvement of East Fifth st., from Main to Elm.

Baton Rouge, La.—Bond issue of \$90,000 for paving will be voted on during May.

Lafayette, La.—City council has adopted ordinance ordering election May 27 on question of levying tax in aid of good roads movement in parish. It provides for levy of one mill for 25 years and issue of certificates for \$75,000 to construct and maintain roads.

St. Martinville, La.—To issue bonds in sum of \$45,000 for purpose of constructing good roads in this parish, police jury has resolved to urge taxpayers to support project.

Baltimore, Md.—Plans for boulevard to run from Chestnut ave. and 33d st. to Woodberry ave., at Railroad ave., are being considered by board of estimate.

Baltimore, Md.—State roads commission is preparing to spread oil on every foot of highways improved by commission. Work will begin as soon as weather settles. Cost will be in neighborhood of \$100,000.

Baltimore, Md.—The state road commission has completed plans for building of 210 miles of state roads this year. **Hagerstown, Md.**—State roads commission is preparing to spread oil on every foot of highways improved by commission. Cost will be in neighborhood of \$100,000.

Grand Rapids, Mich.—Bids received by L. T. Johnson, general manager of good roads commission, for grading of Robin-

son road were so high in comparison to figures received last year on similar work that all were rejected. Board has not decided whether work will be readvertised or let out by day.

Petoskey, Mich.—Supervisors have appropriated \$3,000 to repair washout on Charlevoix road southwest of Petoskey.

St. Johns, Mich.—Petition signed by 300 citizens of St. Johns will be presented to Council asking for two miles of good roads to be built at once on Lansing st. within city limits.

Duluth, Minn.—Various street improvements are under consideration.

Duluth, Minn.—More than 100 property owners on Twenty-third ave. west have decided on the paving material to be used on that thoroughfare. It has been decided to pave avenue from Michigan st. to Fourth st. with brick and from Fourth st. to Piedmont ave. with Class A macadam and concrete curb and gutter. Cost about \$35,000.

Mahnomen, Minn.—County board has been awarded sum of \$2,250 by state highway commission for state road purposes. State road from Waubun through Mahnomen and on to Bijou will be completed coming season.

Virginia, Minn.—Virginia will spend nearly \$50,000 on paving during coming summer, according to plans of street and alley committee and City Engineer E. F. Johnson.

St. Joseph, Mo.—Ordinance providing for construction of artificial stone sidewalks on Sixth st., from Olive to Atchison, a distance of about 20 blocks, at cost of about \$17,000, has been sent to Council by Board of Public Works.

Carson, Nev.—Carson citizens have petitioned County Commissioners to bond the county for \$10,000 to build good roads in county. Most of money to be used on improving the Kings Canyon road, from Carson to Glenbrook, Lake Tahoe.

Bloomfield, N. J.—Steps preliminary to improvement of Myrtle ave., Bloomfield, from Bay ave. to Watchung ave., have been taken by committee, which approved plans and specifications for work, prepared by Mr. Reimer. It is estimated that improvement will cost about \$23,000.

Cranford, N. J.—Ordinances for grading of Sylvester st. and Hamilton ave. have been passed upon final readings by Township Committee.

Elizabeth, N. J.—Repaving of South Tenth st. is being considered.

Irvington, N. J.—Ordinance has been adopted for paving and curbing of Nineteenth ave., from Grove st. easterly. D. H. Greene, Mayor.

Leonia Heights, N. J.—Residents have petitioned for macadamizing of streets from Broad to Glenwood ave.

Long Branch, N. J.—Board has decided to add \$5,000 in proposed bond issue election to be held for purpose of opening Drummond place through to Monmouth street. This will make sum \$10,000 to be voted on by people for this proposition.

Long Branch, N. J.—Sum of \$15,000 has been allowed for repairing Ocean ave.

May's Landing, N. J.—Main street will be rebuilt as part of County road system. Entire road will be regraded, etc.

Merchantville, N. J.—Bond issue of \$100,000 for providing good streets has been carried.

New Brunswick, N. J.—Board has approved of plans for construction of Roosevelt-Woodbridge road from Rahway avenue to Woodbridge. Plans are to be forwarded to State Road Supervisor for his approval.

Newark, N. J.—Unanimous approval of proposition to improve five county roads at cost approximating \$579,000 has been voted by Board of Freeholders.

Passaic, N. J.—Improvement of Autumn street, between Myrtle avenue and Erie railroad has been authorized. T. R. Watson, city clerk.

Passaic, N. J.—Following streets are to be paved with sheet asphalt on concrete base: Mercer street, from Third to Fourth streets; Hudson street, from First to Fourth streets; Mercer street, from Third to Fourth street, and Brinkerhoff place, from Van Winkle avenue to Parker avenue. Thos. R. Watson, city clerk.

Trenton, N. J.—Ordinances have been passed providing for construction of pavements on various streets.

Canastota, N. Y.—Village Board is considering improvements deemed necessary prior to paving of North and South Main streets during coming summer. Provision has been made for meeting cost of pavement.

Firthcliffe, N. Y.—Petition is expected soon to be brought before taxpayers of Cornwall in matter of extending State road from Cornwall bridge to meet other State road which goes through Orr's Mills. Distance is about one mile. Cost would be about \$5,000.

Lockport, N. Y.—Resolution has been adopted for Committee on Highways to make list of roads to be improved under \$50,000,000 bond issue.

Lockport, N. Y.—Petition has been sent to Common Council by Chief of Police Hugh Smith and 24 other taxpayers on Lock street, asking for paving of that street from Pine street bridge to Monroe street with best quality of brick, as result of recent decision not to have that street paved with asphalt, owing to its high cost.

Newburgh, N. Y.—Committee has decided to recommend to City Council that \$1,700 be appropriated for laying of concrete pavement in Mill street, between Broadway and Ann street, and to put down curbs of same material. This will be done as experiment.

Oneida, N. Y.—Oiling of various unimproved streets is under consideration.

Oneida, N. Y.—Bids will be advertised for sprinkling of various streets.

Oneida, N. Y.—Paving of Sands st., from Main to the Feeder; Grove, from Main to East End, and Park ave., from Main to Broad, is being discussed.

Poughkeepsie, N. Y.—Various streets have been ordered paved.

Saranac Lake, N. Y.—Contracts for construction of Saranac Lake-Lake Placid road will probably be let in June.

Schenectady, N. Y.—Bids will be read-

vised for 10,000 sq. yds. of patching and 5,000 yds. of resurfacing.

Syracuse, N. Y.—Ordinance has been adopted declaring intention to order resurfacing of pavement in West Genesee st., from North West st. to Liberty st. Grading of East Colvin st. has been ordered and cost fixed at \$4,800.

Utica, N. Y.—Following paving ordinances have been passed: James st., from Neilson st. to Brinckerhoff ave.; Lincoln ave. to the north line of Watson pl.; Fay st., from Court to Columbia; Canal st., from Schuyler to Bryant; Waverly pl., from Sunset to Watson pl.; Hart st., from Plant to Kirkland.

Henderson, N. C.—A \$200,000 bond issue has been voted for good roads.

Scotland Neck, N. C.—The Halifax county road bond law has been passed. The law authorizes county commissioners to call election on question of issuing not more than \$300,000 in bonds for building, improvement and macadamizing county roads.

Mandan, N. D.—Engineer Atkinson, formerly state engineer, is in city surveying streets that will be paved.

Springfield, O.—Champaign county is to have 3½ miles of new road built this year. Beginning at center of Westville new road will be built half-mile east and west. A half-mile will be built on St. Paris and Urbana pikes beginning at terminal of road completed last

year. Commencing at corporation line a mile of road will be constructed on Northville and Urbana pike.

Toledo, O.—Ordinance to issue \$130,000 bonds to pay for street and sewer work has been passed.

Youngstown, O.—Resolutions have been adopted for improving of various streets.

Portland, Ore.—Street cleaning committee has directed city to advertise for furnishing 3 street flushing machines.

Altoona, Pa.—Board of public works has decided to have 16th and 18th aves., between 11th and 12th sts., paved with Ligonier blocks instead of with brick. Contract for paving of streets is in hands of the Bell-Bockel Co., and they have agreed to do work for \$2.71 per sq. yd.

Chester, Pa.—Several copies of petition are being circulated in Chester asking Court that county bridge over Ridley river at Ninth st. be widened, inasmuch as street will be improved and paved.

Chester, Pa.—It has been decided to readvertise for paving bids.

Cresson, Pa.—Resolution to advertise for bids on laying of sidewalks on certain streets in Cresson, work to be done by borough at extra cost of 20 per cent. to property owners, has been passed at regular meeting of Cresson Council.

Erie, Pa.—Bids submitted by Erie paving contractors have been rejected and city engineer has been directed to readvertise, and also to invite contractors from other cities to send bids.

Easton, Pa.—Mayor Nevin has sent message to Easton councils urging opening of miles of unopened streets to advance progress of city.

Easton, Pa.—State highway department is making preparations to improve Easton-Bethlehem road.

Erie, Pa.—Assistant Engineer W. A. Wynn, of State Highway Department, is in the city making survey of land from Fourth and East avenue to site of General Electric plants, for highway state proposes to open between above two points.

Franklin, Pa.—Repaving of Liberty st. from Moffett's alley to 15th st., has been authorized.

Harrisburg, Pa.—Senate has concurred in house amendments to joint resolution proposing amendment to state constitution permitting state to borrow \$50,000,000 for good roads. Resolution passed last legislature, as required by constitution, and as it does not need signature of governor, it will be voted on by people at November election.

Hazleton, Pa.—Paving of Church and Vine streets is being considered.

Mauch Chunk, Pa.—Petition has been presented to Carbon County Grand Jury asking for improvement of State highway between Mauch Chunk and Lehighton.

Sharon, Pa.—Voters of Sharon will be asked to decide by ballot whether \$50,000 in bonds shall be issued to provide for cost of general street improvements, principally paving, as recommended by street committee.

York, Pa.—Paving of West Market st. from old borough line to West st. is provided for in ordinance introduced by Mr. Harbold. It has been referred to highway committee.

York, Pa.—Ordinance passed by City Council for widening of Codorus Creek to uniform width of 150 ft. between King and Philadelphia sts. has been approved by Mayor Lafear.

York, Pa.—At special meeting of highway committee, highway commissioner has been instructed to get bids for paving and repairing of North George street, from Center square to Philadelphia street. Expense of repair will be divided among city and street railway and telephone companies.

York, Pa.—City Engineer Warner is making arrangements for scraping of macadam streets.

Cranston, R. I.—Sum of \$42,000 has been appropriated for highways.

Cranston, R. I.—Resolution has been passed appropriating \$7,000 for cement curbing and gutters on Bluff ave., Magnolia st., Clarendon st. and Winsor road.

Cleveland, Tenn.—Court has authorized issuance of \$25,000 road improvement bonds.

Cleveland, Tenn.—Citizens of Polk county will vote May 10 on \$250,000 bond proposition for construction of good roads.

Austin, Tex.—City of Austin, through Chamber of Commerce, is planning to build scenic road along lakeside to Bull creek. It is the opinion of Frank S. Taylor, resident engineer for Wm. D. Johnson Company that road could be constructed for about \$20,000, and that preliminary survey and estimate would not cost over \$1,300.

Beaumont, Tex.—Commissioners' court has ordered election for May 22, throughout Jefferson county, to determine whether or not county shall issue \$500,000 in bonds for county roads. Plans for contemplated road improvement which have been outlined by J. R. Shidler, government highway engineer, provide for extension of 120 miles of shell roadway already constructed and for repairs and reconstruction of present system where necessary. Mr. Shidler's report specifies following roads to be constructed: China to Liberty county, Nome to Hardin county, Nome to Hampshire, Rosedale to Amelia, Amelia to Brooks, Port Arthur road (reconstruction), Sabine beach road, Port Arthur to Sabine Pass (reconstruction), Fannett to Hamshire, Mansfield Ferry, Hampshire to Nome, Hampshire to Chambers county, Brooks to Amelia, making total of 94.8 miles.

Dallas, Tex.—Bids will be received by the Commissioners' Court of Liberty County, until 1 o'clock p. m., May 6, 1913, for purchase of \$300,000 road district bonds. J. B. Simmons, County Judge, Liberty County, Tex.

Denison, Tex.—About 12 blocks of Gaudy st. will be paved.

Midland, Tex.—Citizens of Midland county have voted to issue \$50,000 in bonds for good roads.

Huntington, W. Va.—Local Chamber of Commerce has endorsed bond issue of \$1,000,000. Sum of \$200,000 will be used for paving and sewer improvements.

Ritzville, Wash.—Final resolution has been adopted by Board of County Commissioners providing for construction of more than two miles of permanent highway near Washtucna, and county auditor is instructed to advertise for bids. Four miles of permanent highway have been constructed in Adams county, two miles from Ritzville, and two miles in vicinity of Lind.

Rosalia, Wash.—Supervisors of different road districts have been requested to send in maps with most important roads marked, so that committee may have basis for deciding where work shall be done. Approximately 350 miles of road will be built.

Snohomish, Wash.—Resolutions have been adopted for improvement of Avenue A from Milwaukee right of way to Fourth; Avenue B, from First to Sixth; Avenues I and J, from Second to Fifth and Third street, from Union to J.

Spokane, Wash.—Plans have been completed by city engineer for improvement of Trent avenue, from Division street to East Trent bridge. Cost, \$56,900.

Tacoma, Wash.—Bond issue of \$18,000 will be voted on May 10 for extensions.

Superior, Wis.—Plans and specifications for paving of Grand avenue prepared by city engineer's office have been approved by city commission, and board of Public Works instructed to advertise for bids for job.

Superior, Wis.—Resolution has been passed providing for construction of sidewalks in Fifth ward as follows: East side of Hammond avenue, Nineteenth to Twenty-first street; South side of Lincoln street, Hammond to



BESSEMER BLOCK
THE MOST UNIFORM SHALE PAVING BLOCK MADE
Makes a Uniform Pavement that is Durable, Sanitary and Always in Repair
BESSEMER LIMESTONE COMPANY, Youngstown, O.

Cumming avenue; South side of Twenty-first street, Hammond to Cumming avenue.

Superior, Wis.—Resolution will be passed providing for laying out and grading large number of streets in district east and south of Normal school.

CONTRACTS AWARDED.

Birmingham, Ala.—The Alabama Construction Co. of Montgomery, has been awarded first contract for new road construction in Marshall county. Contract calls for building about 17 miles of road at approximate cost of \$2,500 a mile. New road will extend from Guntersville to Boaz, and from Boaz to Warrenton.

Osselka, Ala.—By city, for 10,000 sq. yds. of dollarway pavement to Montgomery Construction Co.

Phoenix, Ariz.—City Council has opened bids for paving of McDowell road. There were three bids presented: The Barber Asphalt Company, \$17,089.01; the Good Roads of Arizona Company, \$13,720.75, and R. Toohey & Sons, \$17,880.36. Bids were referred to committee consisting of city engineer and the superintendent of streets, and committee recommended acceptance of lowest bid, but also recommended that contract be not awarded until special road districts 1 and 2 had awarded contracts for paving half of road lying outside city boundary.

Lordsburg, Cal.—To E. L. Kuns of Lordsburg contract for street improvements at \$34,048.

Sacramento, Cal.—Bids of Clark & Henery for macadamizing of alley between K and L, Eleventh and Twelfth streets, and for macadamizing of Fourteenth street, from I street to L street, with exception of intersections at Fourteenth and J streets and Fourteenth and K streets, have been accepted by City Commissioners.

Venice, Cal.—To Braun, Bryant & Austin of Venice contract at \$13,775 for oiling and constructing sidewalks, curbs and culverts on 5th ave.

New Britain, Conn.—By city of New Britain, contract for paving West Main street with sheet asphalt to Union Paving Company of Schenectady, N. Y. Mayor Halloran has signed the contract.

Atlanta, Ga.—Paving contracts have been awarded as follows: Oak street, Jefferson place and Candler street are to be paved with macadam with chert binder. Contract for these streets has been given to Cement Stone and Tile Company of Atlanta; McDonough street, from courthouse to the Georgia railroad, is to be paved with macadam and will have tarvia binding; College street, from Georgia railroad depot to Sams crossing, will be paved with same; Ponce de Leon avenue, from the courthouse to the city limits in Druid Hills, is to be a macadam pavement with Standard Oil asphalt binder. R. H. Hudson has received contracts for three streets last named.

Indianapolis, Ind.—Bids have been opened by board of public works for paving 21st st. from Central to Talbott aves. The American Construction Co. was low bidder, asking \$2.33 a lin. ft. on each side of street and \$375 for street and alley intersections for asphalt and \$2.20 a lin. ft. and \$375 for intersections for bituminous concrete.

Muncie, Ind.—To William Birch has been given contract for six of following improvements: For construction of cement sidewalk on Eighth st. from Macedonian ave. to Beacon st. at his bid of 49 1/4 cts. per lin. ft.; for construction of cement curb and gutter on Race st. from Jefferson st. to Elm st. at bid of 96 cts. per lin. ft.; for construction of cement sidewalk on Jackson st. from High st. to Franklin st. at bid of 10 1/4 cts. per lin. ft.; for cement walk on each side of Wolf st. from Willard st. to Kirby ave. at bid of 49 cts.; for construction of cement sidewalk on each side of Penn st. from Willard st. to First st. at a bid of 52 cts. per lin. ft. William Torrence has been awarded contract for construction of cement sidewalk on west side of Elm st. from Main st. to alley between Main and Jackson sts. at bid of 66 cts., and for construction of cement sidewalk on east side of Mulberry st. from north rail of L. E. & W. Railroad to Seymour st. at bid of 55 cts. per lin. ft. Bond of Geo. T. Miller for construction of brick roadway in Madison st. from Main st. to Kirby ave., in sum of \$8,891.74, has been approved. Also his bond for construction of brick roadway on Plum st. from Main st. to Jackson st. in sum of \$1,155.40, and another for construction of cement alley between High and Franklin sts. from Howard st. to Seymour st.

in sum of \$701.44. Bond of Western Construction Co. of Lafayette, Ind., for construction of creosote wood block pavement in Washington st. from Mulberry st. to Pennsylvania Railroad, in sum of \$45,000.

Richmond, Ind.—By County Comrs. contract for improvement of National road east, known as the Necieseant Cox improvement, to Sisk-Springle-Level Co. of Portland, at \$47,687.

Shreveport, La.—Contracts for constructing fourteen and a half miles of permanent highways as extensions on roads out of Shreveport to Greenwood, Mooringsport and Belcher, have been awarded by Caddo Police Jury, to cost approximately \$100,000. Contract for five miles was let to Louisiana Petrolithic Construction Company, of New Orleans. Contract for remainder went to Healey Construction Company, of Meridian, Miss.

Baltimore, Md.—Contracts let this year, prices and contractors, are as follows: Baltimore county—City limits to and through Towson, 4.45 miles, Elder Paving Co., \$93,435.47. Carroll county—Fountain Valley-Frizzelburg, 1.37 miles, T. C. Moller, \$17,634.25; Cranberry-Mexico, 1.08 miles, T. C. Forsythe, \$16,027.40; Taneytown-Frizzelburg, 2 miles, Hasmann Paving Co., \$16,853.29. Cecil county—Elkton-Chesapeake City, 4.60 miles, Allen Engineering & Construction Co., \$47,506.95; Elkton-Northeast, 2.46 miles, E. Ward Brown, \$20,100; Elkton toward Northeast, 2.25 miles, Chesapeake Construction Co., \$22,500. Frederick county—Frederick-Middletown, 6 miles, William H. Clagett, \$25,010. Garrett county—McHenry-Hoyes, 4.39 miles, J. E. Francis, \$59,126.50. Harford county—McCann's Corner-Conowingo, .90 mile, Little & Spencer, \$7,921.35; Harford road, 2.40 miles, Luck Construction Co., \$12,500. Howard county—Ellicott City west, 2 miles, T. C. Forsythe, \$9,000. Kent county—Locust Grove to Gelena, 2 miles, Junta Paving Co., \$19,899. Montgomery county—Cedar Grove to Damascus, 2.12 miles, T. C. Moller, \$25,732.51; Frederick line toward Damascus, 2 miles, Hassam Paving Co., \$26,852.12. St. Mary's county—Mechanicsville to Oaks, 5 miles, Hassam Paving Co., \$53,136.25. Somerset county—Crisfield to Marion, 3.09 miles, Hassam Paving Co., \$30,425.56. Talbot county—Easton to Wye Mills, 2 miles, Hassam Paving Co., \$19,536.54. Washington county—Hancock to Allegany line, 2 miles, T. G. Robinson, \$23,140.60; Hagerstown to Clearspring, 8 miles, H. W. Kaylor, superintendent, \$36,000. Prince George's county—District of Columbia line to Marlboro, 4.71 miles, McGuire Construction Co., \$46,636.38; T. B. to Charles county line, 3.59 miles, McGuire Construction Co., \$43,188.91.

Baltimore, Md.—Thomas Mullen was lowest bidder for contract for Road No. 1, to be built in vicinity of new Loch Raven dam, bids for which were opened by Board of Awards.

Baltimore, Md.—Bids of Elder Paving & Contracting Co., lowest bidder for three paving contracts for Commissioners for Opening Streets, have been rejected by Board of Awards and awarded to F. E. Schneider Paving Co. Elder Co. was lowest bidder for Contracts 106, 109 and 111, all of which call for bituminous concrete. In each instance Padgett concern was next lowest bidder. For Contract 106 Elder bid \$20,705.50, while bid of Padgett concern was \$27,099.50. For Contract 109 Elder Co. bid \$5,975.50, while that of Schneider concern was \$6,542.50. For Contract 111 Elder bid \$12,305.06, and "Bob" Padgett's company bid \$13,367.50. For Contract 106 there were only two bidders, and bids of both Elder Co. and Padgett's concern were rejected on ground that they were excessive. Contract will be readvertised. Contract 107 went to P. Flanigan & Sons, that company having underbid Elder Co. by about \$200. Padgett's concern and Eastern Paving Company were only bidders for Contract 110. Schneider Co. was lowest bidder and was awarded contract.

Holyoke, Mass.—Board of public works has voted to accept bid of F. A. Davis & Son for constructing concrete walks at \$1 per. sq. yd. Proposal of the Barrett Manufacturing Co. for furnishing sidewalk materials for season has been accepted.

Duluth, Minn.—Five paving contracts aggregating \$87,000 have been awarded to P. McDonnell by city commission. Jobs, material and bid price are as follows: East Fourth st. between Sixth and 14th aves., asphalt with granite toothing blocks along the car tracks, \$46,281.50; 22d ave., east, between Third and Fifth sts., asphalt, \$4,055; 17th ave., east, between Fourth and seventh sts.

asphalt, \$10,002.26; Sixth st. from 18th ave. east to Woodland ave., asphalt, \$12,321.75; Victoria st. from Woodland ave. to the Hartley road, bituminous concrete, \$14,348.50. The three contracts still to be awarded, hearings on which were held last week, are East First st. between First and Sixth aves.; 23d ave., west from Michigan st. to Piedmont ave., and West Fifth st. between 38th and 43d aves.

Long Branch, N. J.—For paving Second ave., amounting to 22,000 sq. yds. for city and 11,000 sq. yds. for the Tracton Company, to M. C. Burns, using a Mack repressed vitrified brick at \$2.59 per sq. yd. Other bids as follows: Metropolitan, \$2.48; Bessemer, \$2.49; McAvoy, \$2.33; Clymer, \$2.26; Glen Gery, \$2.23; American, \$2.42; Penna. Clay, \$2.46; J. Wesley Seaman is city engineer.

Long Branch, N. J.—For paving Rockwell ave and Third ave., 8,000 sq. yds., to Standard Bitulithic Company of New York at \$2.14 per sq. yd. J. W. Seaman, city engineer.

Westfield, N. J.—Contract for improvement of West Broad street has been awarded to Snyder & Estelle for sum of \$28,000.

Westfield, N. J.—For construction of 7,500 sq. yds. of Dolarway pavement to Schneider & Steele.

Brooklyn, N. Y.—Twenty-three contracts have been awarded for big highway improvements as follows:

Most important highway jobs—two in Long Island City and one in village of Flushing.

F. J. Clancy, of 401 Broadway, L. I. City, was lowest bidder, \$91,162, for repaving with improved granite blocks on concrete foundation, Borden avenue, from Front street to Creek street, at entrance to Thirty-fourth street ferry, Long Island City.

Republic Construction Company was low bidder for paving with wood blocks on a concrete foundation, Steinway avenue, from Washington to Flushing, bid \$89,134. Same company's bid, \$44,480, was lowest for paving with wood blocks on concrete foundation, Broadway, Flushing, from Lawrence street to Leavitt.

Other jobs and lowest bidders for same and amount of bids are as follows: For 5,700 feet 8-inch vitrified pipe and 480 feet 12-inch cast iron pipe, delivered on Shell road, Corona, from National to Summit avenue. E. E. Buhler & Co., \$1,378.80; for paving with asphalt blocks Elm street, from Crescent street to Second avenue, Elmhurst. Hastings Paving Company, 25 Broad street, N. Y. City, \$8,336; for grading, curbing, flagging and paving with sheet asphalt Silver street, from Fresh Pond road, Ridgewood section to a line 300 feet west of that highway, Borough Asphalt Company, 1301 Metropolitan avenue, Brooklyn, \$2,020; for paving with asphalt blocks Radde street, from North Jane street to Paynter avenue, Long Island City, Hastings Paving Company, \$10,008; for grading and paving with sheet asphalt DeKalb avenue, Ridgewood, from Onderdonk to Woodward avenue, Borough Asphalt Company, \$3,825; for grading and paving with wood blocks Crescent street, Long Island City, from Wilbur to Webster avenue, Republic Construction Company, \$6,770; for grading, curbing and flagging Ridge street, Long Island City, from the Boulevard to Ely avenue, Henry Steers, Inc., \$12,000; for grading, curbing and laying sidewalks in Ditmars avenue, L. I. City, from Ditmars avenue to a point 400 feet south, Joseph Horgan, \$2,930; for grading and paving with improved granite blocks Crescent street, Long Island City, from North Jane street to Wilbur avenue, Henry Kordes, \$2,270; the same contractor was lowest bidder at \$19,310 for grading, curbing and flagging in Cypress avenue, Ridgewood, from Gates to Myrtle avenue, from Manhattan Beach Division to the Long Island Railroad to Vermont avenue; for grading, curbing, laying sidewalks and crosswalks on Thirteenth street, Long Island City, from Vernon to Hunter avenues, J. Di Menna, bid \$12,540; for grading, curbing and laying sidewalks and crosswalks on Charles place, Town of Newtown, from Clermont to Rush street, National Foreproofing Company, \$7,479.95. The same company for the same work on Hill street, from Clermont to Rush streets, \$14,818.08; for grading, curbing, laying cement sidewalks on Helen street, from Metropolitan avenue to Ziedler street, Middle Village, Henry E. Kordes, \$1,765; for repaving with improved granite blocks Fulton avenue and Main street, Astoria, from Boulevard to Van Alst avenue, F. P. Clancy, \$30,512; for paving with sheet

asphalt Flushing avenue, Long Island City, from Van Alst avenue to North Henry street, Warren Quinlan Asphalt Company, \$17,335.50; for repaving with sheet asphalt Ninth avenue, Long Island City, from Broadway to Jamaica avenue, Warren Quinlan Asphalt Company, \$8,093; for furnishing and delivering 1,760 feet of 12-inch cast iron pipe, distributed in all the wards, Standard C. I. Company, \$2,094.40; for furnishing and delivering 7,800 linear feet of vitrified pipe, distributed in all the wards, E. E. Buhler & Co., \$3,866.

Cedarhurst, L. I., N. Y.—By village trustees contract for paving of Washington and Cedarhurst aves. and Spruce and Chestnut sts., to Standard Bitulithic Co. About 15,000 sq. yds. of pavement will be laid at \$1.82 a yard, making more than three miles of paved streets in the village.

Rochester, N. Y.—Constructing Norton st. walks, to Michael Franciosa, for \$512.75; Marlow st. walks, to Passero & Petrossi, for \$34.65, and Fraser st. asphalt, to Rochester Vulcanite Co., for \$2,149.

Schenectady, N. Y.—Contract for paving of Bradley st. has been awarded to J. W. Davitt, of Troy, it being a part of general street paving contract.

Syracuse, N. Y.—Paving Hawley avenue, to G. B. Dickison, \$40,333.55; and for paving Lancaster avenue to Warner-Quinlan Asphalt Company, \$24,164.80.

Hamilton, O.—To Wirtz & Garver, for street cleaning work, at 82½ cts. per cu. yd.

Youngstown, O.—Contracts for nearly four miles of brick roads (20,114 ft.), costing \$65,468.83, have been awarded by Good Roads Commissioners following receipt of checks for \$150,775 from C. E. Dennison and Co., of Cleveland, who purchased this year's issue of bonds. Contracts were awarded to lowest bidders as follows: Hubbard road, from Erie tracks to Trumbull County line, 5,221 ft., to James McCarron for \$13,786.23; Belmont ave. extension from the city limits to the Trumbull County line, 4,450 ft., to James McCarron for \$12,089.60; McGuffey road, from the city limits to the Coitsville Township line, 2,517 ft., to James McCarron for \$6,602.30; Highland ave., from the Youngstown and Southern tracks to Market st., 923 ft., to Kane & Smith, for \$2,611.50; Cornersburg road, from Hopkins road to the Canfield Township line, 6,715 ft., to Kane & Smith for \$19,650.82; Logan ave. extension from the city limits to the Trumbull County line, 2,488 ft., to Andrew Serafino for \$9,826.38.

Knoxville, Pa.—For construction of 1,200 sq. yds. dollarway pavement, to Saml Gamble, Carnegie, Pa.

Seranton, Pa.—Director of Public Works C. V. Terwilliger has awarded contracts for 11 paving jobs and 4 sewer jobs to be started at once. Paving contracts are as follows: Lafayette st., Fillmore to Van Buren ave., estimated cost \$8,248; combination asphalt and stone block, to R. C. Ruthven, at \$2.15 per sq. yd. Ridge row, Monroe to Webster aves., \$9,877, asphalt, to MacDonald Construction Co., at \$1.83 per sq. yd. Luzerne st., Third ave. to Railroad ave., combination, \$7,456. MacDonald, \$1.97. Maple st., Cedar to Pittston aves., combination, \$4,570. R. C. Ruthven, \$2.26. Moosic st., Prospect ave. to Roaring Brook bridge, asphalt, \$5,139. R. C. Ruthven, \$1.90. New st., Washington to Capouse, combination, \$8,955. MacDonald Co., \$1.83. Pine st., Clay to Webster aves., combination, \$4,072. R. C. Ruthven, \$2.45. Walnut st., Washington to Capouse aves., \$14,304. R. C. Ruthven, \$1.80. Mulberry st., Prescott to Arthur aves., combination, \$15,821. R. C. Ruthven, \$2.28. Electric st., Monsey to Sanderston aves., asphalt, \$4,152. MacDonald Co., \$1.89. Prescott ave., Mulberry st. to Ash st., combination, \$21,706. R. C. Ruthven, \$2.28.

Fort Worth, Tex.—Texas Building Co. is only concern which entered bids on each of eight cardinal and sub-cardinal roads to be built from Fort Worth to county line. Both Grapevine and Mansfield roads are divided into two sections each for contracts. Ten sets of bids were received, and in each instance Texas Building Co. was lowest. The ten bids of Texas Building Co. totaled \$656,603.85. Nine bids next lowest, no competing bid having been made on Cleburne road, totaled \$697,768.58. Following are bids as they have been tabulated by J. C. Travilla, directing engineer of work: Grapevine (section "A")—Texas Building Co., \$64,746.40; Tarrant Construction Co., \$87,638.95. Grapevine (section "B")—Texas Building Co., \$72,825.25; Cobb & Gregory, \$91,531.95. Dallas Road—Texas Building Co., \$94,488.12; Austin Brothers, \$108,519.16; H. H. Ruthven, \$2.28.

K. McCollum & Co., \$113,721.99. Mansfield Road (section "A")—Texas Building Co., \$51,646.87; D. Purvis, \$57,411.04. Mansfield Road (section "B")—Texas Building Co., \$61,328.45; H. K. McCollum & Co., \$66,709.14. Burleson Road—Texas Building Co., \$49,360.50; Maddox & Fagan, \$56,460.38. Cleburne Road—Texas Building Co., \$51,710.91; Weatherford Road—Texas Building Co., \$68,492.37; H. K. McCollum & Co., \$74,402.95. Azle Road—Texas Building Co., \$61,965.26; Cobb & Gregory, \$72,673.88. Keller Road—Texas Building Co., \$79,479.72; W. T. Montgomery, \$82,421.13.

Salt Lake City, Utah.—For sidewalk extension No. 160 to G. A. Herman, 723 Holland Bldg., St. Louis, Mo., at \$39,217.03, and for extension No. 163 to Will Harmon at \$3,128.65.

Seattle, Wash.—By city for regrading, paving Sixth avenue to Independent Asphalt Paving Co., at \$98,938.25; for bitulithic paving on Pine street to Barber Asphalt Paving Company at \$50,468.53, and for concrete walks on Brandon street to D. H. Traphagen at \$17,963.58.

Spokane, Wash.—By City Council, contract for paving North Monroe st. hill, Cora to Fairview ave., to Mitchell Bros. for Spokane bituminous No. 2, city's own specifications for rough surface asphalt paving. Mitchell bid was \$13,126 and lowest received for No. 1. Estimate of City Engineer for this class of paving was \$14,900. Portion of the paving will be of brick, on steep grades.

Spokane, Wash.—By City Council, contract to Spokane Bitu-Mass Paving Co., for paving of Overbluff road & Twentieth ave., at \$5,500.

Spokane, Wash.—To C. M. Payne for grading, curbing and sidewalk Glass avenue, Post to Monroe street; estimate, \$1,700; bid twice, \$1,325.

Antigo, Wis.—For constructing pavement on Superior st. and Fifth ave., to L. P. Tradewell, at \$24,897.

West Allis, Wis.—By city for street paving to White Construction Co., Milwaukee, at \$1.85 per sq. yd.; also to same firm for combination cement curb and gutter at 55 cts. L. P. Fish, city clerk.

SEWERAGE

Berkeley, Cal.—Bonds for \$50,000 for improvements have been voted in election held in Berkeley. Sum of \$475,000, largest item in issue, will be expended for improvement of sewerage system.

Newark, Del.—Engineers from office of T. Chalkley Hatton, of Wilmington, have nearly completed preliminary work for plans for proposed sewer system.

Daytona, Fla.—Ordinance is in preparation to bond city for amount sufficient to install sewerage system. The report of Clyde Potts, expert sanitary engineer, has been received and read at special meeting of the council. Alderman E. S. Hall gave notice that at next regular meeting of council ordinance would be introduced for bonding city for said purpose. Estimate of cost given by Engineer Potts is \$150,000 for installation of complete sewer system, and he recommends that city supplement this with system of open ditches to handle surface water drainage.

East Moline, Ill.—City Council has adopted ordinance, providing for construction of storm drainage system, to cost about \$198,000.

South Bend, Ind.—Petitions have been received for pipe sewers on Parkobash avenue and Tonti avenue from Lafayette to Iroquois streets and for grade, curb and walk on St. Louis street, from East Howard to St. Vincent streets.

South Bend, Ind.—Resolution has been adopted for construction of sewer in Olive street.

Mt. Aye, In.—Installation of sewerage system is under construction.

Dodge City, Kan.—City Commission is in receipt of information that State Board of Health has approved plans drawn by Fred Eckert, City Engineer of Larned, for new Dodge City sewer system. Bids will be received within short time. Plans are based on population of 15,000, while present population is about 5,000.

Lexington, Ky.—Resolution has been adopted for construction of sanitary sewer on West Short st. J. J. O'Brien, city clerk.

Baton Rouge, La.—Bond issue of \$40,000 for sewerage extension will be voted on during May.

Biddeford, Me.—Engineer will be engaged to look over proposed route of

proposed new sewerage system and report to council.

Iron Mountain, Mich.—Lowest bid received for construction of sewers was that of Phil, O. Sheridan & Co., Houghton, Mich., at \$10,725. Sol. Beauparlant, City Clerk.

Dover, N. J.—Alderman Edward Kelly and Councilman Arthur P. Van Gelder and Robert Richards, with similar representation from Boonton, will confer shortly with committee representing Jersey City, to formulate plans looking to installation of trunk sewer from this part of watershed of Rockaway River.

Irvington, N. J.—Ordinance has been adopted for sewer connections in Nineteenth ave., from Grove st. easterly. D. H. Greene, Mayor.

Paterson, N. J.—Bonds in sum of \$400,000 for trunk sewers will be sold at 4 p. m., May 8.

Albany, N. Y.—Bill authorizing Syracuse to issue \$100,000 bonds for system of storm water sewers in First and Second Wards has been introduced in Senate by Senator J. Henry Walters. Measure, which is amendment to Intercepting Sewer Board act, gives board powers to prepare plans and specifications and to award contracts for constructing sewers.

Lockport, N. Y.—Aldermen will recommend construction of 12-inch sewer in Walnut st., from Harrison av. to Lovers Lane.

Schenectady, N. Y.—Plans and specifications for trunk sewer, sewage lift and sewage disposal plant for this city have been filed by City Engineer Wooley with State Department of Health at Albany and it is expected that plans will be returned shortly with approval of board.

Toledo, O.—Ordinance to issue \$130,000 bonds to pay for sewer and street work has been passed.

Urbana, O.—Installation of sewer in alley in rear of North Main st. between Church and Court sts. has been petitioned for.

Ontario, Ore.—Proposition submitted to people to issue bonds for sewer system has been carried.

Chester, Pa.—Ordinance has been introduced in Borough Council for the purpose of borrowing \$40,000 to be used to construct sewage system. A. F. Damon is borough engineer.

Lewiston, Pa.—Plans are being prepared by G. A. Flink, of Harrisburg, for sewage disposal plant, to cost \$30,000. J. Harry Saxton is Secy. Boro. Council.

York, Pa.—According to estimate made recently by George W. Fuller, consulting engineer of New York city, \$100,000 set aside in loan bill now pending in city council will be ample to place York's sanitary sewage system in operation.

Gettysburg, S. D.—Installation of sewer system has been authorized.

Huntington, W. Va.—Local Chamber of Commerce has endorsed bond issue of \$1,000,000. Sum of \$200,000 will be used for sewer improvements.

Martinsburg, W. Va.—At special meeting of city council resolution authorizing appointment of sewage commission has been passed. Commission will have entire charge of proposition to issue bonds to amount of \$2,000 for purpose of constructing modern sewerage system in Martinsburg with adequate disposal plant.

North Yakima, Wash.—Altered construction which would save city \$20,000 in sewers alone, and abandonment of plans for construction of drainage system until more definite data can be obtained, are recommended in report of H. Dav Hanford, chief engineer of Stone-Webster corporation of Seattle, on plans which had been used by city commissioners as basis for bond election of \$260,000. Plans and estimates of City Engineer Gillman for sewer system, drain system and disposal plant were submitted to Engineer Hanford after protest from number of taxpayers had induced commissioners to call off bond election. Plans for the disposal plant are approved entire. Those for the sewer system are altered to save \$20,000 by reducing the size of two main pipes.

Tacoma, Wash.—Election will be held May 10 for voting on bond issue of \$102,000 for construction of certain sanitary and storm sewers. H. H. Edwards in City Clerk.

Superior, Wis.—Commission is planning to pass resolution providing for laying of sewers in district south of Normal school. Cost of sewer system would be approximately \$8,000.

CONTRACTS AWARDED.

Pine Bluff, Ark.—By Commissioners Sewer District No. 16 contract to Robinson Bros., of Pine Bluff, at \$7,172.55, to construct sewers.

Bridgeport, Conn.—By Paving and Sewer Comr. contract for sewer on Fairfield ave., from Clinton ave. to railroad viaduct, to Angelo Conti & Co., of Hartford, at \$5,900.

Atlanta, Ga.—Sewer Committee of Council has canvassed bids for constructing lateral sewers in 1913, and awarded contracts to lowest bidders. The Dysard Construction Co., of Atlanta, gets three groups, and F. D. Harvey & Co., of Memphis, gets two groups.

South Bend, Ind.—To Inter-State Constr. Co., of Hammond, Ind., contract for construction of Bowman Creek sewer, at \$150,000. Chicago sewer brick will be used.

Baltimore, Md.—By board of awards sanitary sewerage contract No. 110 to McCarthy & O'Herron at their bid of \$146,833.70.

Lowell, Mass.—Bids received for sewer casting—City iron foundry, \$2.45 per 100 pounds; J. P. Robinson Co., 1 1/2 cents a pound; Pevey Foundry, 2 1/2 cents a pound; Doherty Bros., \$1.58 a hundred pounds. Contract will go to Doherty Bros.

Detroit, Mich.—Contracts have been awarded to lowest bidders for construction of lateral sewers as follows: No. 2424—In alley in block bounded by Evans ave., Piper boulevard, Freud and Jefferson aves.: Otis Cement and Const. Co., \$2,300; Western Const. Co., \$2,143; T. G. Whittaker, \$2,143. Western Const. Co., of Lafayette, Ind., is low bidder. No. 2425—In alley in blocks bounded by Wilson ave., Hamilton boulevard, Montrose and Troy aves.: Wm. Blanck & Co., \$3,600; Otis Cement and const. Co., 3-700; Western Const. Co., \$3,550; T. G. Whittaker, \$3,600. Western Construction Co. is low bidder. No. 2427—In alley in block bounded by Parker and Maxwell aves., Moffatt st. and Gratiot ave.: Jno. S. Affeld, \$2,047; Wm. Porath, \$2,670; T. G. Whittaker, \$1,999. T. G. Whittaker is the low bidder. No. 2428—In alley in block bounded by Parker and Maxwell aves., Moffatt st. and Gratiot ave.: Jno. S. Affeld, \$2,047; Wm. Porath, \$2,670; T. G. Whittaker, \$1,999. T. G. Whittaker is the low bidder. No. 2431—In alley in block bounded by Central and Parkinson aves.: Parkwood and St. Johns st.: Jno. S. Affeld, \$2,186; Wm. Porath, \$2,157; T. G. Whittaker, \$2,200. Wm. Porath is the lowest bidder. No. 2433—In alleys in block bounded by Begole, Ironwood, Milford and Tireman: Wm. Blanck & Co., \$2,350; Otis Cement & Const. Co., \$2,894; Western Const. Co., \$2,122; T. G. Whittaker, \$2,200. Western Construction Co. is low bidder. No. 2434—In alley in block bounded by Hurlbut, Bewick (extended), Canfield and Forest aves.: J. S. Affeld, \$855; Wm. Blanck & Co., \$900; Wm. Porath, \$882; T. G. Whittaker, \$804. T. G. Whittaker is the low bidder.

Audubon, N. J.—Council has opened bids for construction of lateral sewer, disposal plant and equipment. Bids ranged from \$135,399.25 to \$79,260.15, a difference of \$56,139.10. Specifications were drawn up by County Engineer John J. Albertson. All of the bids were made piece-meal, specifying certain amounts for various purposes. Section 68 of the specification was for sewerage disposal works complete; 69, pump house and all equipment; 70, siphon under West Jersey and Seashore Railroad and the manholes; 82 was the lump sum of work, including mains.

Central Construction Company, of Philadelphia, was lowest bidder by \$9,365.

Pitman, N. J.—For construction of storm water sewer by Boro. Council to Pugh & Hubbard, of Philadelphia, Pa., at \$10,279.

Albion, N. Y.—Board of Sewer Commissioners have awarded contract for construction of new municipal sewer system to Ripton & Murphy, 609 Livingston Bldg., Rochester, at \$150,768.80. Hager & George, of Newark, N. Y., had withdrawn their bid of \$148,321.30.

Brooklyn, N. Y.—Bids have been opened in office of Borough President Connolly of Queens, for thirty contracts, lowest bids of which aggregate \$621,889.26. Twenty-three of contracts are for big highway improvements and seven for sewers. Leading undertaking is proposed big trunk sewer in Liberty avenue, Morris Park, from Lefferts avenue to Nebraska avenue, and in South Curtis avenue, from Liberty avenue to Atlantic. This is one of main trunk connections of big Richmond Hill

and Woodhaven sewer systems, and consists of 1,197 feet of 7-foot by 8-foot reinforced concrete main; 538 feet of 7-foot by 7-foot 6 inches; 1,255 feet 7-foot by 6-foot; 1,063 feet of 7-foot by 5-foot 6 inches; 1,196 feet of 5-foot diameter and 1,014 feet of 4-foot 9-inches, all of reinforced concrete. Lowest bidder is Joseph L. Sigretto, 1455 Woodhaven avenue, Woodhaven, L. I., \$116,395.23.

Same bidder was lowest at \$10,321.01 for sewers on Liberty avenue, from east side of Ocean avenue to Oxford; Ocean avenue, east side, Lawn, McCormick and Oxford, in all of the above, from Liberty avenue to the crown, 300 feet south of Kimball avenue. Green Construction Company was lowest on two other Richmond Hill sewer contracts, \$11,987.23 for mains in Beaufort avenue, from Lefferts to Maure, in Birch, Spruce, South Vine, South Cochran avenue and South Villa street, from Beaufort avenue to Chichester avenue, and \$16,656.78 for mains in Jerome avenue, from Lefferts avenue to Maure, and in Birch, Spruce, South Vine and South Morris avenue and South Wickes and South Villa streets, from Jerome avenue to Beaufort, and in South Cochran avenue, from Beaufort to crown, about 350 feet south of Jerome. Harry Britton was lowest bidder at \$20,378.65 for building another lot of Richmond Hill mains, in Jerome avenue, from Greenwood to Lefferts, Chestnut, Walnut and Church streets, and Hamilton and Briggs avenues, from Jerome avenue to Chichester, and in Cedar avenue, from Jerome to Beaufort. Above are all to be completed in from 100 to 200 working days and will provide for large part of Richmond Hill. William Cravello was lowest bidder at \$23,550 for construction of mains at Far Rockaway, in Redfern avenue, from McNeil to Leland place, and in Leland place, from Redfern avenue to sewage disposal plant. John Hart was lowest bidder at \$2,648.60 for constructing test pits in Fifty-first street in Corona for purpose of examining subsoil conditions in conjunction with construction of sewer in Fifty-first street, from the bulkhead line in Flushing Bay to Lurting (Willow) street.

Cedarhurst, L. I., N. Y.—To Standard Bitulithic Company, to install drainage system with catch basins and pipes. Each basin will cost \$55 and the pipes 50 cents a lineal foot. The improvements will cost \$31,000.

Syracuse, N. Y.—Contract for building 15-inch sewer in South Warren street, between East Jefferson and East Onondaga streets, will be awarded to James Swift. He was lowest bidder at \$2,117.50.

Reading, Pa.—To Fehr & O'Rourke, to build sewers on Elm and North Sixth sts., Reading. Bid for former is close to \$62,000.

Seranton, Pa.—By Director of Public Works C. V. Terwilliger, for four sewer contracts, as follows: Diamond ave. and Ward st., estimated cost \$2,800, to Summa & Co., at \$1.49 lin. ft. Mylert ave., Green Ridge st., to Marion st., estimated cost \$1,573, to Vincenzo Vaccaro at \$2 per lin. ft. Albright ave., Lackawanna River to Green Ridge st., estimated cost \$3,305, to C. L. S. D'Andrea, at \$1.45 per lin. ft. North Main ave. and Euclid ave., estimated cost \$14,324, to Vincenzo Vaccaro, at \$1.49 per lin. ft.

South Bethlehem, Pa.—To R. P. Bennis for house sewer connections on New st., at 90 cts. per lin. ft.

Sioux Falls, S. D.—By City Commissioners for construction of storm water sewers on South Minnesota and Summit avenues to Dearborn and Jackson, at following bid: 18 inch pipe, \$1.00 per foot; 10 inch pipe, \$.40 per foot; 12 inch pipe, \$.50 per foot; 15 inch pipe, \$.60 per foot. Walter C. Leyse, city auditor.

Nashville, Tenn.—By Board of Public Works contract to W. B. Garrett of Nashville, at \$2,177.40, to construct sewer on East Lindsley and Woodland streets.

Houston, Tex.—By City, contract to Freund & Quay at \$108,557.40 to construct Second Ward storm sewer and at \$3,930 to construct McKinney avenue sanitary sewer.

Seattle, Wash.—For construction of sewers in E. 51st street, W. J. Donofrio at \$34,085.19.

Spokane, Wash.—By city for following contracts: To Skulerud, Peterson & Borgen, sewer in Gardner avenue, Adams street, to 337.5 feet east; estimate, \$1,040; bid price, \$913. James C. Broad, sewer in alley between Shannon and Indiana avenues, Belt to Walnut street; estimate, \$4,320; bid price, \$3,499.

West Milwaukee, Wis.—For constructing sewage disposal plant for village of West Milwaukee, from plans of G. C. Geiger, Mack Blk., Milwaukee, to Coddington Eng. Co., Milwaukee, at \$5,764. Other bidders: Meyer Constr. Co., \$6,590; Chas. A. Sauer, \$6,814; Steinhagen & Klinger, \$6,820; W. J. Werner, \$6,945; Esau Kroening Constr. Co., \$6,981; Northwestern Concrete Co., \$7,100.

WATER SUPPLY

Anniston, Ala.—Announcement has been made that Anniston Water Supply Co. will extend its mains to Fifth Ward, formerly known as Oxanna.

Los Angeles, Cal.—Bond issue of \$1,500,000 for Los Angeles trunk line, which will bring water into city from end of the aqueduct, has been carried.

Parlier, Cal.—Waterworks system will be installed.

Richmond, Cal.—Installation of municipal water system has been authorized.

San Francisco, Cal.—The Public Utilities Committee of Supervisors has recommended that \$15,000 be appropriated in next budget for enlargement of municipal water works at county line, so that University Mound district may be supplied. Well is to be sunk and pump installed.

Woodland, Cal.—Woodland adopts resolution in favor of calling bond issue of \$70,000 for improving water and sewer systems, improvements required by growth of city.

Abbeville, Ga.—Bond issue has been voted for installation of waterworks.

Vidalia, Ga.—City has just voted \$25,000 in bonds for improving water and light systems and for erecting city hall.

Zebulon, Ga.—Bonds have been voted for construction of water works.

Cuba, Ill.—Election will be held May 1 for voting of question of waterworks.

Indianapolis, Ind.—Water board ordered company to lay water mains in various streets.

Mt. Aye, Ia.—Installation of waterworks system is under consideration.

Jetmore, Kan.—Election will probably be held for voting on water and light bonds.

Ville Platte, La.—Construction of complete system of waterworks is being discussed.

Taunton, Mass.—Appropriation orders that received their final readings have been adopted included \$55,000 for water works construction and for installation of new pumping engine at the Harris st. station.

Grand Rapids, Mich.—Board of Public Works is considering question of supplying new pump for water works.

Kittsville, Minn.—Village council is in favor of construction of system of waterworks.

Fenton, Mo.—Installation of system of water works is being considered.

Monroe, Mo.—Installation of waterworks system will be voted on April 28.

East Orange, N. J.—Water board has decided to advertise for bids for new centrifugal pump for White Oak Ridge, which will be installed as reserve measure.

Canastota, N. Y.—Village Trustees have called special election for Friday, May 16, on \$3,500 water main proposition.

La Salle, N. Y.—There will be special election to vote on appropriation of \$15,000 for extension of water mains, also for good roads.

Lockport, N. Y.—Aldermen in committee of whole have voted to recommend to Water Board construction of two large feed mains as suggested several times by Supt. of Water Works Charles Peterson. One main is to start at 24-inch main on Transit st. and will be 12 inches in diameter, running east on Willow, south on Beattie ave. to High, to Hyde Park, to Mulberry, to Pound, to Walnut and thence to Vine st. where a six-inch main will continue to Lovers Lane where the new Almshouse will be located. The main at Vine st. will connect with one to feed the Second Ward. Other main will run from South Transit 24-inch pipe out North Transit st. to Hill st. where it later may be available for connection with milling district under hill.

Belfield, N. D.—Bond issue for water works system will be submitted to voters.

Fremont, O.—Ordinance has been adopted for bond issue for construction of water mains.

Lima, O.—Bids will be asked for a \$6,000,000-gal. pump and for extension of mains in South Lima; also for rebuilding of reservoir. Estimated cost, \$100,000.

New Straightsville, O.—Installation of waterworks system has been petitioned for.

Toledo, O.—Council has passed ordinance for issue of \$150,000 of 4½ per cent. bonds for completion of work of enlarging Broadway waterworks pumping station and building large connection mains in front of plant.

Youngstown, O.—Ordinance providing for expenditure of \$40,548 for remodeling present filter plant and one carrying \$45,000 to install three new water lines across river has been referred to improvements committee by council. These two plans are included in general reconstruction of pumping station and filter plant.

Connellsburg, Pa.—Connellsburg Chamber of Commerce and representatives of Pittsburgh Flood Commission are discussing plans for construction of reservoir and dam to impound waters of Youghiogheny River.

Erie, Pa.—Extension of water main in Twenty-fourth street, between Parade and Wallace Streets, has been approved.

Chattanooga, Tenn.—Bill is being considered authorizing bond issue of \$2,000,000 for purpose of purchasing or building of municipal water plant.

Willis, Tex.—Bond issue for waterworks system will be submitted to voters.

Salt Lake City, Utah.—Appropriation of \$500 to replace worn out old redwood tank now in use by water department at head of old highline, has been granted the superintendent of waterworks by city commission.

Norfolk, Va.—Water Commissioners are said to be considering new water supply, to cost about \$2,000,000.

Huntington, W. Va.—Local Chamber of Commerce has endorsed bond issue of \$1,000,000 for Huntington. Of this \$800,000 would be used to install city water plant and \$200,000 for paving and sewer improvements. It is probable that the old water plant, owned by Pittsburgh parties, would be taken over.

Hillyard, Wash.—At special meeting of Hillyard city council it was decided to adopt plan of City Engineer Wadham for division of city into three water districts, and to install metallic trunk mains in each district. Bids on trunk mains from 8 to 12 inches in diameter will be advertised for, 6 inch mains to be installed at once.

CONTRACTS AWARDED.

Pensacola, Fla.—By water and gas committee of city council, contract for building reservoir at pumping station of city water works to C. H. Turner Construction Co., whose bid was placed at \$6,822.80, bid of this company being lowest and time for finishing work the shortest. Bids received were as follows: Charles M. Ward, \$9,998; 90 days time. W. P. Kennedy, \$7,200; 95 days time. Turner Construction Co., \$6,822.80; 90 days time. John Gerkins, \$9,450; 90 days time. Blount Construction Co., \$10,989; 45 days time. S. F. Fulghum, \$9,687; 120 days time.

Wood River, Ill.—By village trustees, contract for extension of water and sewer mains to Bash & Gray of Joplin, Mo., at \$6,000.

Holstein, Ia.—For laying about 4,000 ft. 4-in. water mains and 12 6½-ft. American or Eddy hydrants, to O. J. Sacquety, of Holstein, at \$3,700.

Lafayette, La.—For installing machinery and equipment for improving water and light plant to Anderson Offutt, of New Orleans, at \$24,675. Engineer is Harold Raymond, of New Orleans.

Duluth, Minn.—To Gogebic Steam Boiler Works for furnishing two sections of 42-inch pipe to water and light department of city of Duluth at price of \$277.

Grand Island, Nebr.—To Grand Island Contract Co. contract for laying pipe for water works extension. J. H. Miller is water works and electric light commissioner; H. E. Clifford is city clerk.

Jamestown, N. Y.—To Epping-Carpenter Co., of Pittsburgh, Pa., contract for proposed 6,000,000 gal. reciprocating pumping engine at \$18,980.

Plattsburgh, N. Y.—By city for 6,000 ft. 8-in. water main on Summer School st., to McComby & Costello, of Plattsburgh, at \$1.14 per ft.

Linton, Ore.—For constructing water works to Jas. Kennedy Constr. Co., of Fargo, N. D., as follows: Excav. and backfill trenches—Earth, per cu. yd., 40 cts.; gravel and boulders, per cu. yd., \$1; solid rock, per cu. yd., \$2.50. Excav. and backfill, reservoirs—Earth, per cu. yd., 35 cts.; gravel and boulders, per cu. yd., \$1; solid rock, per cu. yd., \$2.50.

Furnishing and laying c-i. pipe—4-in., Class B, per lin. ft., 55 cts.; 4-in., Class C, 58 cts.; 6-in., Class B, 72 cts.; 6-in., Class C, 77 cts.; 8-in., Class B, \$1; 12-in., Class B, \$1.65. Special castings, per lb., 4 cts. Furnish and laying galvanized iron pipe—2-in., per lin. ft., 18 cts. Constructing reservoirs, complete, each 120,000-gal. capacity—No. 1, \$2,500; No. 2, \$2,800; No. 3, \$2,500; No. 4, \$2,800. Constructing pump houses—At reservoirs Nos. 1 and 3, \$350 each. Furnishing and installing pumps and motors and reservoirs Nos. 1 and 3, each \$1,200. Total, including valves, hydrants, boxes, cocks, meters, etc., \$92,739.

Tarentum, Pa.—By Council, contracts for waterworks, as follows: Part 1—Concrete work, to J. I. Dick, based on unit prices, aggregating for the quantity estimated, \$15,128; also steel reinforcement 55,000 lbs, at 3 cts. per lb., \$1,650. Part 3—Mechanical equipment for filters to the Pittsburgh Filter Mfg. Co., for \$5,100. Part 4—Coagulating basin equipment, also to the Pittsburgh Filter Mfg. Co., at \$1,300. Part 5—Held in abeyance for present time, and no boiler be bought for the next few years. Part 6—High duty pumping engine of low-pressure turbine type, to Wilson-Snyder Co., at \$4,640, and cross-compound, crank and flywheel, to the International Pump Co., at \$3,875. Part 7—Two low-lift pumps, to Reineke-Wagner Co., at \$1,352. Part 9—Standpipe, to the Treadwell Construction Co., for \$3,976. Part 10—For 14-in. pipe line, on the unit price, to J. I. Dick, for the estimated quantity, amounting to \$3,060. Part 12—Excavation, also to J. I. Dick, for \$548.

Halifax, N. S.—By city to Standard Constr. Co., of Halifax, contract for construction of reinforced concrete reservoir and gate house, with roof, at \$55,107.

LIGHTING AND POWER

Abbeville, Ga.—Bond issue has been voted for installation of electric lighting.

Vidalia, Ga.—City has just voted \$25,000 in bonds for improving light and water systems and for erecting city hall.

Fowlerton, Ind.—Movement is on foot for town to be supplied with electric lights during summer.

Martinsville, Ind.—City council has approved resolution giving citizens right to vote on question of improving city light plant to furnish current for commercial purposes, to erect municipal gas plant, or to buy gas and electric plant from present commercial company, and called election for May 15.

Jetmore, Kan.—Election will probably be held for voting on light and water bonds.

Wildwood, N. J.—Wildwood Crest Council will replace lighting system of boardwalk with ornamental iron poles, with latest improved electric lamps.

East Kingston, N. Y.—Lighting system has been petitioned for.

Poughkeepsie, N. Y.—Alderman D'Arcy has moved that committee of seven be appointed to ascertain what it would cost for installing municipal electric lighting plant.

Rome, N. Y.—Installation of ornamental lighting of business section has been authorized.

Silver Lake, N. Y.—Harrison Town Board has acted favorably on petition of residents of Silver Lake for establishing lighting district. It is planned to install one large Welsbach gas lights and Westchester Lighting Co. will have lights turned on by July 4. The lights will cost \$31 a year.

Chambersburg, Pa.—Bids will shortly be asked for installing new machinery in electric light plant, at cost of about \$30,000.

CONTRACTS AWARDED.

Los Angeles, Cal.—By Board of Public Works contract with Los Angeles Gas and Electric company for furnishing light current to city's 3,702 arc lights for May at cost of \$6.30 per light.

Fort Wayne, Ind.—By Board of Public Works contracts for furnishing and installing ornamental light posts for Wayne, Washington and Jefferson sts., from Harrison to Clinton, to Hanna-Brackenridge Co. This firm bid low on both features of contract.

Brainerd, Minn.—The Cuyuna Range Power Co., of which M. D. Stoner is president and general manager, has accepted council proposition and will light Brainerd. Company is to furnish electric current at 2½ cents a kilowatt for

the first 800,000 kilowatts and 2 cents for all in excess. Pumping is to be done for 1½ cents. Term of contract is to be twelve years.

Newburgh, N. Y.—Contract has been awarded to Morris Iron & Steel Co. for 24 ornamental street lighting poles equipped with globes for use in extension of Broadway lighting system from Dubois to Mill st.

Rochester, N. Y.—The Rochester Railway and Light Co. has been awarded contract for installing new lighting system in Elm st., from Main to Chestnut st.; in South ave., from Main to Court st.; in Clinton ave. North, from Main st. to Monroe ave., and in West ave., from the Erie Canal to the city limits, at a cost of 25 cents per light per night for four years.

FIRE EQUIPMENT

Gadsden, Ala.—Purchase of piece of motor apparatus and motor cycle is being considered by the Auto Fire Truck Committee.

Berkeley, Cal.—Bonds in sum of \$500,000 for improvements have been voted in election. Part of this amount will be used for purchase of additional apparatus for fire department.

San Jose, Cal.—Purchase of motor apparatus and 2,500 ft. of 2½-in. hose has been recommended by Chief Edward Haley.

Frederica, Del.—Arrangements have been made for installing modern fire-fighting paraphernalia.

Lewes, Del.—Automobile fire truck will be purchased.

De Land, Fla.—Budget for 1913-14 has been adopted and appropriation was included in fire and water fund of \$1,000 to be used to apply on purchase of automobile fire wagon in discretion of committee.

Rock Island, Ill.—Sum of \$2,600 has been asked for purchase of new hose, \$6,000 for equipment and \$6,000 for new station.

Davenport, Ia.—Purchase of motor hose wagon emergency motor truck, life net, and 1,000 ft. of 2½-in. hose has been recommended in annual report of Chief Peter Denger.

Topeka, Kan.—Purchase of aerial truck and erection of new station are recommended.

Newport, Ky.—Purchase of new hose is under consideration.

Highlands, Mass.—Municipal Council has decided that next piece of auto fire kit brought to this city would be automobile chemical and hose truck for new Highland fire station.

Grand Rapids, Mich.—Board of Police & Fire Commissioners are asking \$76,000 to make added fire fighting improvements.

Manchester, N. H.—Appropriation of \$6,800 has been made to replace horse-drawn truck of Engine 3, Lake ave., with a motor ladder truck.

Newark, N. J.—Purchase of 25,000 ft. of hose has been recommended by Chief Paul J. Moore.

Auburn, N. Y.—Estimates are being received by Auburn Fire Department for construction of steel tower in Franklin st. for pompier drills.

Ironton, O.—Director of public safety will at once readvertise for bids for motor apparatus.

New Holland, O.—Chemical engine may be purchased.

Ambler, Pa.—A piece of motor apparatus to cost about \$6,000 will probably be purchased by the Wissahickon Fire Company.

Franklin, Pa.—Purchase of automobile fire truck has been authorized.

Mt. Carbon, Pa.—Funds are being raised to purchase chemical engine.

Olyphant, Pa.—Motor apparatus may shortly be purchased.

Peckville, Pa.—City is considering purchase of motor apparatus.

Johnston, R. I.—At financial town meeting of Johnston appropriations of \$1,000 for apparatus for Hose No. 3 at Manton and \$300 for apparatus for Thornton Volunteer Fire Company have been made.

Pawtucket, R. I.—Purchase of motor apparatus has been authorized.

Chattanooga, Tenn.—Construction of fire hall in Ridgedale is asked for.

Denton, Tex.—City has purchased site and will erect fire station on south side, which means increasing efficiency of the department.

Wheeling, W. Va.—Additional fire apparatus has been recommended by National Board of Fire Underwriters. E. T. Rose is chief.